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Although it is perhaps preaching to the converted, allow me to summarise the value of a laboratory such as you have generously and wisely established. This may conveniently be done under the following heads, though there is some overlapping:—

1. *From the Point of View of the Community and of the Individual Patient.*—The first duty of the medical profession is the prevention of disease; the second, its cure; a large proportion of diseases, acute and chronic, are due to infection, and it is obvious that the sooner the nature, and so the means of spread, of an infective disease are detected the earlier can appropriate measures be taken to prevent the epidemic prevalence of that disease. Thus enteric fever, thanks to sanitary science now comparatively infrequent, sometimes imitates common influenza, and bacteriology, or the science of infection, may show that what clinically appeared to be influenza is in reality enteric fever; as the result of this information the special sanitary and other precautions can then be mobilised to abort what might otherwise have become a serious and expensive outbreak. The occurrence of diphtheria in a school or institution usually depends on the presence of a "carrier," and this unconscious focus can be localised only by bacteriological examination. The first cases of anthrax, glanders, plague, botulism, and other infective diseases fortunately rare in this country, but therefore apt to pass unrecognised, should if seen at a hospital with laboratory facilities be correctly diagnosed, and as a result the public health authorities are enabled to take prompt steps for the control of their further spread. Complete coördination of the medical profession for the prevention of disease requires a close association of the laboratories of towns and districts with the local hospitals. The individual patient's disease often cannot be accurately diagnosed without the help of a clinical laboratory, and therefore in common justice to patients this provision should be available. Further, modern treatment must often be checked and modified by laboratory tests.

2. *From the Point of View of the Medical Profession.*—Without the assistance of a laboratory a medical man in his fight against disease is much in the same position as a pugilist with one arm tied behind his back. As the late Sir William Osler [2] remarked, a great defect in medical practice is that the laboratory facilities employed in teaching hospitals for the diagnosis of disease are not often available to the qualified man when he starts work in the world. It is, therefore, important that every town and district should have a suitable laboratory connected with a hospital which should be the centre of medical work and activity. If deprived through no fault of his own of the opportunities of utilising the methods he was familiar with as a student, and of acquiring a knowledge of the progress of medicine by contact with a laboratory and a hospital, the medical man's efficiency must deteriorate, and his patients suffer accordingly. The early diagnosis of infectious diseases, such as enteric, diphtheria, cerebro-spinal fever, and syphilis, may be impossible for him, and the results disastrous to the community. To insist further on this dependence of internal medicine on laboratory assistance would be tedious; but it would be only a very partial statement of the value of a clinical laboratory in a hospital to say that what the operating theatre is to surgery the clinical laboratory is to medicine; for the surgeon is dependent on the laboratory for aid in diagnosis and prognosis, including the problem of when to operate and when to hold his hand, and for many points in the treatment of his cases. Thus, to recite two obvious examples, a piece of tissue removed at an early stage of an operation can in a few minutes be frozen, and from the verdict of the immediate microscopical examination the surgeon knows then and there whether the disease is inflammatory, innocent, or malignant, and whether a comparatively small operation, such as the removal of a fibro-adenoma from the breast, or the more extensive operation of clearing out the axillary glands, is the right course. Similarly, immediate examination of tissue from a swelling in connexion with bone may decide whether it is inflammatory (quiet necrosis) or an innocent tumour (myeloma), and the incision all or nearly all that is required, or whether it is a sarcoma and the limb must be amputated. From the patient's point of view the gain from such facilities on the spot may be great; for if the material has to be sent to a distance a further operation with all its attendant anxieties and pains may be required, instead of the complete procedure at one sitting; or, for lack of this information, an unnecessary operation may be performed. The efficiency of the kidneys can now be determined by laboratory tests, showing when it is safe to operate on an enlarged prostate and when it is wise to wait until the risk of fatal uræmia, as a result of operative interference, has passed. The advance of medicine as a science and art owes much to laboratory work, but our knowledge is far from complete; for additions to medical science we look to laboratories all over the country, which should therefore be centres for research as well as for diagnosis.

3. *From the Point of View of the Governing Body.*—As the Board have to provide the funds for the upkeep of the laboratory and the salaries of those in charge, which should be on an adequate scale, it might appear at a very superficial glance that the lay governors' reward would be summed up in the words, "it is more blessed to give than to receive"; but however unselfish this conduct might appear, they are responsible for the financial interests of the hospital—as a business proposition—and must see a reasonable return for fresh expenditure, especially in these lean years. The demands entailed by an efficient clinical laboratory therefore require some justification. Now, apart from the imperative need for a laboratory as essential to a modern efficient hospital, its cost should be regarded as an eventual economy and in the light of an insurance against the spread of disease not only in the community at large, which would tend to increase the work and running expenses of the hospital, but also in the institution itself; for example, an outbreak of diphtheria among the patients may necessitate the closure of a ward; among the nurses it may cause considerable expense. Against the hard cash put down for the upkeep of the laboratory must be reckoned the potential cost of epidemics preventable by the prompt detection, isolation, and treatment of a first case, and in some instances by the protective inoculation of contacts and others. Thus a single case of diphtheria is detected in an early stage by laboratory methods and treatment by diphtheria antitoxin established; the spread of the disease is prevented by disinfection and by special care in the nursing; by the application of Schick's test those within the range of infection and susceptible to infection can be recognised and rendered immune by the prophylactic injection of anti-diphtheritic serum, should there be any loophole in the sanitary precautions; and, further, "carriers" can be detected and isolated, and thus the development of other cases minimised.

JOHN ELLIOTT, O.B.E., M.D., F.R.C.P.

In conclusion, the tribute you have paid to his memory is the one John Elliott would most highly have appreciated. He is in your minds to-day as you knew him, and although we entered as students at St. Bartholomew's Hospital on the same day—the first of October, 1881—I cannot hope to add to your knowledge of the man. Born on Sept. 29th, 1861, at Whitchurch, Salop, and educated at Owens College, Manchester, he was an exceptionally able student, gaining the open entrance scholarship in science at the hospital and taking high honours in the London University with apparent ease. As he held resident surgical appointments at St. Bartholomew's and at the General Hospital, Birmingham, he seemed destined for a brilliant career in surgery; but after failing in his application for a recognised step on the surgical ladder at his old hospital school, he took up internal medicine, rather to the surprise of those who thought they knew his bent of mind. He became M.R.C.P. in 1891 and F.R.C.P. in 1908, thus recalling a previous John Elliott (obiit 1691), Fellow and Censor of the College, who in an outspoken manner accused the Prince of Orange of treason and was therefore committed to Newgate in 1689. Of the late John Elliott's services as a member of the staff of the Royal Chester Infirmary from 1895 until his untimely death this laboratory will be a lasting and most appropriate memorial. Not only was he exceptionally able, but he had the faculty—not always found with such intellectual gifts—of doing everything to which he turned his hand with the might that ensured success. The field of his activities was wide both in the strictly professional subjects and in science; a first-class general physician, he had a well-equipped laboratory of his own for the elucidation of his cases, thus realising the ideal of present-day medicine in the investigation of morbid function; he was much interested in radiology, played an active part in the treatment of venereal disease, and, as recently as 1921, formulated precautions [3] necessary in the administration of salvarsan. His work for the infirmary went far beyond the discharge of a physician's duties, for he was the driving force in the initiation and execution of the important additions and improvements begun ten years ago. He took a strong line in the High Court in the matter of disclosing the confidence of a patient, was active in the war, and was responsible for the organisation of medical service in his district.[4] His knowledge of the antiquities of Chester was extensive, as was well shown in some published articles [5] and a lecture [6]; natural science found in him a keen devotee and he was an expert in colour photography. In all this there was much to admire, but there was more; his force of character and will-power made him the man he was and accounted for the universal confidence he inspired.

References.—1. Mackenzie, James: Reports of the St. Andrews Institute for Clinical Research, vol. i., 1922. 2. Osler, W.: Brit. Med. Jour., 1914, ii., 335. 3. Elliott, J.: Ibid., 1921, ii., 478. 4. Idem, ibid., 1921, i., Supplement, 89. 5. Idem, ibid., 1912, i., 134; 1913, i., 235. 6. Idem, ibid., 1914, i., 29.

Further Observations

ON THE USE OF

CARBOHYDRATES IN THE NAUSEA AND VOMITING OF PREGNANCY.

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ÆTIOLOGY.

IN a previous paper one of us [1] has put forward in extenso the underlying principles which guide the treatment of nausea and vomiting of pregnancy. Those principles, briefly expressed, are that there are three fundamental factors to be considered, both from the standpoint of ætiology and of treatment.

1. *Metabolic Factor.*—This, the primary factor from the ætiological standpoint, shows itself as a glycogenic disturbance in the maternal liver. It expresses itself in the urine by the presence of β-oxybutyric acid and aceto-acetic acid. It is the origin of the fatty degenerated liver found at autopsy in fatal cases of pernicious vomiting. Its value is enhanced by starvation—the resulting carbohydrate deprivation intensifying the symptoms.

2. *Neurotic Factor.*—This was defined as an unduly sensitive sympathetic nervous system. Normal reflexes are heightened in pregnancy; the whole nervous system is in a condition of hypersensitivity, and such a condition reinforces the metabolic fault, for the influence of the sympathetic nervous system on the glycogen stores of the liver is well known. The influence of neurosis has been well recognised in vomiting of pregnancy ever since the time of Kaltenbach,[2] who strongly urged its importance. Indeed, it may become so important as to dominate the clinical picture and demand a major share of the therapeutic attention. Nevertheless, ætiologically it has been placed in a secondary position for reasons given in the previous paper already referred to, and in controlling the neurotic factor one must not lose sight of the metabolic disturbance. This is illustrated in Case N. N. The converse is also true, that exclusive attention to the metabolic condition will not result in a cure of pernicious vomiting of pregnancy in face of a continued state of high nervous excitement. See probabilities in Case Bk.

3. *Intestinal Intoxication Factor.*—This factor is now so well recognised that it seems almost superfluous to insist upon strict attention being paid to the condition of the bowel. This does not mean that a state of continual purgation be insisted upon. An occasional cathartic, and preferably one chosen by the patient herself, is usually all that is required if a diet high in vegetables is being taken. At the beginning of a treatment veg. lax. pil. I. or a mild aloin pill in the evening, followed by a simple cleansing enema the next morning, may be used with advantage, especially if the treatment is to include nutrient glucose enemata.

There is also the factor of *dehydration* in the severer forms of vomiting of pregnancy; how far this is a factor in the earlier forms—in which its clinical manifestations are not evident—has not been determined. It must be emphasised that more than one factor may be present in the same individual; indeed, it is usual to find the metabolic and the neurotic factors together, and both must be allowed for in the therapy.

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Ætiologically, we have thus narrowed down the cause of nausea and vomiting of pregnancy to three, or, at the most, four fundamental factors; by so doing we exclude a number of causes to which the condition has at various times been attributed. We mean to imply not that there may not be other contributory causes in particular cases, but that these causes contribute their quota to the nausea and vomiting only in so far as they reinforce, either directly or indirectly, one or other of the aforementioned ætiological factors. In this manner we look upon the so-called "reflex" [4] origin of pregnant vomiting. Malpositions of the uterus, inflammation of the cervix, endometritis, and other such maladies of the female generative organs—to which, at various times, the origin of vomiting of pregnancy has been ascribed—do not of themselves bring about such a disturbance. The pain and the fear that such a condition may lead to further untoward disturbance of the pregnancy or the patient herself, however, certainly must contribute to the neurotic factor; and surgical procedure, by relief of local symptoms, would aid materially in a cure of the vomiting, by thus lessening the nervous element in the case. The febrile condition is also an occasional contributory cause. It must be remembered that the first three months of pregnancy in woman are probably marked by a loss of nitrogen, if we judge human pregnancy by that of animals; [5] if to this normal loss we add a second loss of nitrogen brought about by febrile reaction to acute infections we only intensify the condition. Moreover, the febrile condition is coincident with a diminution of "available water" leading to a disturbance of water balance.[6] Certainly the water balance in fever is disturbed, in the direction of less water for urine formation, and this cannot help but reinforce any dehydration present in a severe case of vomiting, or make of it a factor which had previously been non-existent. Case C illustrates the effect of fever accompanying pyonephritis. We have also another case where the vomiting occurred with the onset of a mild attack of influenza.

Although we have in this manner separated out the various factors in the ætiology of nausea and vomiting of pregnancy, we have not explained why the condition only occurs in about 50 per cent. of pregnancies. The very fact that mild cases of nausea and vomiting are so common that they are held to be the almost inevitable accompaniment of child-bearing is evidence, in our estimation, that we are dealing with a temporary disturbance of a physiological balance. Undoubtedly, the nutritional condition of the woman at the time of conception will be a large determining factor in whether she develops nausea or not. Moreover, a number of cases have been observed where therapeutic abortion had to be performed on account of excessive vomiting in successive pregnancies of patients who later went through a further pregnancy successfully without any disturbance when a high carbohydrate diet had been in use for some time previous to conception. An ill-nourished, nervous woman would much more readily develop the condition than the better-conditioned and more phlegmatic type. Nevertheless, the phlegmatic type may show as much distress as the apparently less favoured group.

Theories of Causation.

Moreover, it has yet to be discovered what controls the relationship of hepatic and placental glycogen. Various theories of failure of internal secretion have from time to time been advanced as the cause of nausea and vomiting of pregnancy. The thyroid [7] and the suprarenals [8] have been particularised as the origin of the trouble, but there is nothing about either to suggest a connexion between them and the minor and major periodicity of nausea and vomiting of pregnancy which we have postulated as necessary to any theory. It is true that changes in the thyroid take place during pregnancy, but those changes do not correspond to either the minor or the major periodicity of nausea and vomiting of pregnancy. Moreover, the practical

applications of such theories have not been as uniformly successful as should be expected.

Whatever may be discovered on the ultimate origin of nausea and vomiting of pregnancy—whether it is merely a question of malnutrition in the mother before or at about the time of conception, or whether some internal secretory organ which normally controls the relationships of the maternal liver and the placenta, is at fault—we feel certain that it is not due to any specialised toxins elaborated by the growing fœtus or its appendages, combined with the failure of the mother to manufacture an antitoxin. The growth of fœtus and placenta and uterine wall present no special metabolic peculiarities; the placenta contains a larger percentage of arginine than other tissues, but the amount is not excessive.

The newly pregnant organism does, however, show a condition of rapid growth superposed upon an adult organism which has ceased to grow. Metabolic strains are certain to be set up in the mother to meet the sudden and unaccustomed nutritional demands of the parasitic fœtus. The mother must also equip herself with a means of defence against the newcomer. It is in this way that metabolic strains and stresses are produced, that nitrogen loss is observed at this period, and, as we believe, glycogen deficiency occurs in the maternal liver. It is particularly unfortunate that the term "toxæmia" has been used in connexion with this condition of pregnancy; the term "toxæmia" is inevitably associated with the word "toxin"—although it is correct enough if used in its original sense. The looseness of the term "toxæmia" has led to a corresponding looseness in thinking. It is not, however, usual to talk of the toxæmia of diabetes or the toxæmia of acidosis, though such a designation might be in order, as both conditions may lead to death. Both conditions, however, represent a disturbance of metabolic balance, and in this light we regard the condition of nausea and vomiting of pregnancy. Parallels between pregnant vomiting and cyclic vomiting in children and vomiting in the starvation treatment of diabetes [9] are easily made, but in neither of the two latter do we assume any specialised toxin as the origin of the disturbance. The child later in life grows out of his cyclic vomiting—i.e., his metabolic balances adjust themselves, and diabetic vomiting ceases when we restore the suddenly further-disturbed metabolic balance by feeding. It is interesting to note that the eclamptic disturbances which may characterise the latter half of a pregnancy also occur at a period of rapid fœtal growth. We thus do not see that in the present state of our knowledge it is necessary to make any further assumptions in the ætiology of nausea and vomiting of pregnancy.

TREATMENT.

The therapeutic measures which we have suggested to combat nausea and vomiting of pregnancy are fourfold.

1. The use of carbohydrate to correct the lack of maternal hepatic glycogen. This would range, depending upon the severity of the condition, from an alteration of diet in the direction of increasing cereals, vegetables, and fruit in mild cases, to the use of intravenous and interstitial glucose injections in the very severe forms.

2. Rest in bed with isolation in cases where the neurotic factor makes itself pronounced, and it usually does so in all but the very mild cases. As a sedative, bromide may be given by rectum in doses varying from 30 gr. once in the evening to 40 to 60 gr. t.i.d., depending upon the clinician's recognition of the severity of this factor and the patient's reaction to rest and isolation alone. As a general rule, however, the higher dosages are unnecessary. Their need is most evident when the patient vomits not only any fluid given by mouth, but when the vomitus begins to be in excess of this and the tissue fluids themselves supply the necessary water.

3. The keeping open of the bowel, usually in a gentle manner, by an occasional laxative for the mild cases, and an evening laxative, followed by a cleansing enema in the morning for the hospital cases.

4. The administration of water to correct any dehydration, and by doing so, to ensure the flow of all secretory and excretory fluids as far as the water factor in them is concerned. Fluids to the amount of 60 oz. are urged by mouth in all cases. Additional fluid in the severe cases will be supplied with the glucose, either by rectum or by interstitial or intravenous injection.

For the convenience of general readers we have included a rather contracted description of the method of treatment adopted in the different cases. This description is intended as a guide and not as a complete lexicon. No detailed directions can be evolved to suit each particular case, and the clinician's success in applying the treatment will in a great measure depend upon his grasp of the underlying principles and his skill in recognition of the value of the ætiological factors in each individual patient.

Classification.

Classify your case roughly into mild, moderate, and severe.

Mild.—All cases of simple nausea or "morning sickness" or those showing occasional vomiting; able to retain food.

Moderate.—Frequent vomiting, with or without continuous nausea; no epigastric pain or jaundice; able to retain food either only occasionally or only with difficulty. Dehydration may be present.

Severe.—Frequent or continuous vomiting. Epigastric pain, jaundice, inability to retain food, dehydration invariably present.

Make routine *urine examination* (on 24-hour specimen if possible). The mild and some of the moderate cases show a urine of medium specific gravity, normal colour, and give a test for acetone bodies by the Rothera test. Others of the moderate cases and all severe cases show highly coloured urine, high specific gravity (over 1025), and test for acetone bodies. Bile may also be present. Trace of albumin is invariably present, but no casts. Any case showing urine characteristic of the severe type should be classed as such for purposes of treatment, even though other findings would indicate classification as "moderate."

Treatment of Different Types.

Mild.—For three or four days leave out of diet all meat, fish, chicken, soups and broths, butter and cream. Before rising, patient to eat an apple, banana, or a few crackers. She must eat plenty of fruit, either fresh or stewed, vegetables, salads, bread, toast, crackers, rusks. May take jams, jellies, custard, and sparingly of milk and eggs. Diet to be taken in five small meals throughout the day instead of the usual three meals. Fluids: Water, weak tea, home-made lemonade or orangeade to make up 60 oz. a day. At end of three or four days ordinary diet may be resumed if taken in a number of small meals. *Fats must be taken sparingly.* Attend strictly to bowels at all times.

Moderate.—Rest in bed at once, with isolation. Any patient showing neurotic factor to be isolated in hospital. Make no attempt to feed by mouth, unless patient feels hungry and asks for food. Cleanse bowel by simple enema each morning. Give nutrient enemas of 6 to 8 oz. 10 per cent. glucose in saline t.i.d. Give very slowly by fine catheter. Murphy drip may be used if desired, but usually it is not well borne. Urge fluids by mouth to 60 oz. a day.

On subsidence of symptoms commence feeding by a little dry toast or crackers. If well borne, next day give mashed potato, a little jam or jelly with toast. Continue to increase the diet by consecutive additions of vegetables and fruit until the diet resembles diet in mild cases. Continue enemas until acetone bodies disappear from urine, then gradually discontinue, leaving night enema to end. Add protein to diet on disappearance of acetone bodies, starting usually with chicken or fish. Bromide, 30 gr., may be added to night enemas if indicated.

Severe.—Hospital treatment only. Strict isolation. Treatment as in moderate cases, but give either interstitial glucose, 500 c.cm. of 10 per cent. solution in saline, or intravenous glucose, 1000 c.cm. of 5 per cent. solution in saline, in addition to nutrient enemas, as above. Bromide up to as high as 60 gr. may be added to each enema if the symptoms are very severe and the urine continues to show a high specific gravity in spite of treatment. Codeine, ½–1 gr., may be given subcutaneously the evening following an interstitial or intravenous injection. The interstitial injection†

† In the preparation of sterile glucose solutions for intravenous use only the purest glucose must be used, and prolonged sterilisation must be avoided. It is most desirable to sterilise the saline solution separately, and then add the requisite amount of solid powdered glucose to the hot saline, and re-sterilise for a short period. The solution for intravenous use should be bright and clear, and should not be caramelised in any degree. Neglect of these precautions leads to undesirable after-reactions.

is very painful and should not be used more than twice. It sometimes has a salutary effect upon a refractory patient.

On subsidence of symptoms the feeding follows the directions of the moderate cases.

As dieting forms such an essential part of the after-treatment of the moderate and severe cases, and as diet will entirely and rapidly control the mild nauseas and sicknesses, we have included a suggestive list from which the patient may select such dishes as suit her taste once she is well under control. It is important that such a choice should be exercised, as monotony of diet must be avoided, and the patient should not feel in the period of her convalescence that she is unduly restricted. We must urge that a carbohydrate diet does not mean a cereal diet exclusively. It must include vegetables and fruits at least twice a day. A diet instruction sheet similar to this is given each patient when she leaves the hospital, or to each patient when her morning sickness is under control, with a more exclusive carbohydrate diet.

Diet Instruction Chart.

The patient may exercise her choice of food under the following directions:—

Cereals.—Oatmeal porridge or any of the patent breakfast foods, taken with milk. Brown or white bread. Toast, rusks, cream crackers, biscuits.

Vegetables.—Any vegetable in any form except fried.

Fruits.—Any fruit, either fresh or stewed.

Meats.—Lean bacon or ham, beef, lamb, mutton, veal (no pork), chicken (avoid duck, goose, game). Any fish except salmon, mackerel. Eggs. Croquettes or rissoles if not fried in deep fat.

Soups.—Any soup, thick or clear, but free from fat.

Sweets.—Any jam or jelly. Marmalade or honey. Milk puddings. Boiled pudding occasionally. Pies or tarts may be taken occasionally (twice a week), but rich cakes and pastries must be avoided.

Salads.—Any salad, but sparingly of salad dressing.

Fluids.—Water, aerated water, home-made lemonade, orangeade, weak tea, coffee. Milk if desired. No alcohol of any kind. Butter may be taken if desired, but not in large amounts. Cream, fat meats, and any dish fried in deep fat should be avoided. Fruits and vegetables must be taken at least twice a day, and meat not more than once a day.

The above list gives ample variety. It is low in fat, medium in protein, and high in carbohydrate. By keeping up the high amounts of fruit and vegetable an ample supply of necessary vitamins is ensured for the growing fœtus. In connexion with the vitamin supply of the growing fœtus, we do not wish to strain an already overloaded theory, but we believe it is pertinent to inquire how far some of the manifestations of neuritis in pregnancy can be traced to a deficiency of water-soluble B in the diet of the expectant mother.

The treatment as thus outlined for the moderate and severe cases does not represent a radical change. The use of glucose, added to the already well-recognised treatment of the neurotic vomiting by rest and isolation, makes it, in our opinion, an advance on distinctly conservative and evolutionary lines. Indeed, if the literature be carefully searched many authors will be found to have recommended a plan of treatment very similar in character to that which we have just proposed. Thus the treatment suggested by Freund,[10] Runge,[11] Winter,[12] Wallich,[13] Stolz,[14] and Lynch [15] all contain the germ of the idea, though variations are to be noted in each. Those treatments, however, were more or less empirically developed and applied only to what would be termed pernicious cases. The treatment which we have proposed, and successfully used, has been developed on a physiological basis, and includes in its scope the mildest pregnant nausea as well as the most pernicious vomiting.

CONTROL OF TREATMENT.

The control of a treatment such as has been outlined is an important factor in its success. Mild cases of nausea or "morning sickness" present no special difficulty. The patient's symptoms are usually a sufficient guide. In dealing with moderate and especially severe cases of vomiting, however, the inexperienced physician requires some indications as to when to stop the treatment and when to pursue it more vigorously if he is not meeting with the success he is expecting. At the end of this paper are reported four cases of vomiting of pregnancy illustrating phases of this problem. It is not necessary, though it is a decided advantage, to have a complete laboratory at hand for the study of the case. It is, however, necessary to have the fluid intake charted, to collect a 24-hour specimen of urine from day to day, and to determine its volume and specific gravity (preserve the 24-hour specimen with a little toluol in the collecting bottle). If the case is progressing satisfactorily it will be found that the fluid intake is high, that the volume of urine excreted increases, and, most significant of all, that the specific gravity decreases. It will invariably be found in such cases that the clinical condition improves with the alteration in the urine. In a later paper the more precise laboratory findings in some of these cases will be published; here we wish to confine ourselves to such determinations as are necessary for the successful conduct of a case, and can be carried out by any competent medical man with the assistance of a nurse or help to control the fluid intake and the collection of the urine. If, on the other hand, after five or six days' vigorous treatment by the methods given the patient's condition does not improve, the urine volumes remain low, and the specific gravities remain high, we should deem it advisable to carry out therapeutic abortion. (See Table III.)

Our observations confirm the futility of some of the older indications for the necessity of therapeutic abortion in vomiting of pregnancy.

Pulse-rate.—Several of the older observers [16] have insisted that a pulse-rate persistently at or over 100 is an indication for abortion. Many of our cases show such a pulse, but there is no difference between those cases in which we found it necessary to abort and those in which success was attained. We have collected the results together in a table, arranging the cases roughly in order of severity of vomiting. (See Table I.)

TABLE I.—*Average Daily Pulse-rate.*

R	T	N	Br	G	NN	McK	Ck	M	I	C	Rd	Bk
82	95	82	88	102	98	92	89	104	74	93	84	84
78	90	81	87	68	98	94	70	90	80	90	97	83
78	80	84	87	90	117	93	82	100	79	124	104	82
84	83	77	69	92	103	86	82	102	86	100	116	93
84	88	84	84	91	100	84	84	96	86	111	109	68
82	92	86	74	93	104	84	84	81	87	100	107	61
				90	106	75	91		77	92	95	74
				77	108	82			75	97	86	92
				104	107	87			78	87	82	86
				94	96	84			87	120		91
				86	96	87			93	87		87
				90	93	79			88	97		
					95	76			89	109		
						76						
						79						

Therapeutic abortion performed on Cases Rd and Bk. Case C complicated by pyelonephritis; therapeutic abortion later for that cause. Case I, retroverted uterus; treatment successful. Treatment successful remainder of cases except G, which was probably a case of malingering.

Ammonia Coefficient.[4]—The fallacy of a high ammonia coefficient as a sign demanding therapeutic abortion in pernicious vomiting has been exposed again and again. Yet it still persists. Consequently, we have tabulated the ammonia coefficients of a number of our cases from day to day. The fallacy of *passing judgment on a determination of one isolated specimen of urine* is almost too glaring to be contemplated. Our coefficients are not extraordinarily high, nor is there any marked difference between our successful cases and our failures. The cases are arranged in order of their clinical severity. The highest coefficients were found in a case of moderate severity and persisted throughout the treatment, although the patient improved rapidly from a clinical standpoint. (Table II.)

Ammonia.—In view of the failure of the ammonia coefficient to act as an index for the necessity for therapeutic abortion, it has been suggested that the

daily ammonia output be used instead, as it is subject to less fallacies than the coefficient. The figures which we have obtained will be published later. We may say, however, that the course of the ammonia excretion does give a truer idea of the patient's metabolic condition and the effect of the treatment

TABLE II.—*Daily Ammonia Coefficients.*

R	N	Br	NN		Ck	M	Bk	
14·6	9·8	12·4	23·2	21·3	12·5	18·1	10·3	17·1
18·0	13·7	12·0	33·3	20·0	19·5	15·7	17·2	12·3
13·5	14·1	16·4	26·9	20·7	23·0	10·7	19·4	O.
11·3	13·0	13·4	29·0	18·2	18·0	11·1	21·2	15·8
10·9	11·3	14·2	31·0	16·3	11·1	9·1	23·6	10·3
10·5	13·4		27·6	9·1	8·7	10·7		
4·6	2·7		24·6		5·7			

Therapeutic abortion case Bk. Remainder of cases successful. O = Operation.

than the determination of the coefficient. The excretion of ammonia is one stage nearer the origin of the metabolic disturbance, but even this determination is not so significant as the determination of the excretion of the total acetone bodies. No further information, however, is to be gained from a clinical standpoint than can be obtained from the observance of the total 24-hour excretion of urine and the course of the specific gravity. Table III. shows how invariably in a successful case the specific gravity falls, and how in the two cases in which it was judged clinically advisable to perform therapeutic abortion the specific gravities remained at a high level.

TABLE III.—*Specific Gravity of Urines from Day to Day.*

R	N	Br	NN	McK	Ck	M	I	C	Bk
1017	1025	1029	1027	1005	1019	1024	1025	1015	1032
1024	1027	1017	1026	1004	1018	1017	1026	1013	1030
1015	1019	1015	1018	1004	1015	1012	1021	1019	1035
•1012	1017	1011	1013	• —	1012	1009	R.U.	1018	1025
1010	•1014	—	1011	1006	1007	1009		1016	1023
1016	1015	•1022	1014	1005	•1011	•1009	1021	1017	1026
1014	1015		1014	1007	1012	—	1030	1012	1025
			1011	1008		1013	1022	•1010	1023
			•1012	1007		1010	—	1009	O.
			1011				1012	1015	1015
			1010				•1008	—	1010
								—	
								1016	

Last two figures of specific gravity given.

• Protein in diet. R.U. = Replacement of uterus. O = Operation.

Case I. was eating carbohydrates on third day. Operation on uterus caused return of vomiting. Case C complicated by pyelonephritis. Case McK following influenza. Water intake always very high.

RESULTS.

The results of the treatment of nausea and vomiting of pregnancy by thus taking into account the metabolic, neurotic, intestinal intoxication and dehydration factors in the same patient have been most encouraging. Thus Duncan [17] reported a series of nearly 200 cases of all grades of nausea and vomiting treated in this manner with very few failures. He had had to perform therapeutic abortion in only one case in the past two years. Titus, Hoffman, and Givens,[18] who have worked out a method of treatment almost identical with ours, reported in their first paper a series of 76 cases with two failures—one of these distinctly traceable to breaking of regulations. Since then they have added a further 68 cases with equally good results.[19] The literature of pernicious vomiting contains many examples of enthusiastic reports of cures by many and various means. It contains also an approximately equal number of reports by independent observers, as thoroughly discouraging as the previous reports had been enthusiastic of the same method of treatment. This is due, we believe, to the unrecognised strength of the neurotic factor and to its being influenced by the personality of the medical man.

We have endeavoured to correct this personal factor by collecting the results of a group of obstetricians who have had experience for a year of the carbohydrate treatment—obstetricians competent but not specially skilled in laboratory work and each working independently. At the end of a year's experience a questionnaire was sent to each of them, and it was left to the individual judgment of each to decide the success or failure of his treatment. It is significant that not one of them has any thoughts of abandoning the method of treatment. In this way the results which we are publishing are *average results obtained under differing conditions of clinician, and of hospital, or home treatment.*

Table IV. shows 135 cases of all kinds treated throughout the year, with 98 successes, 25 improvements, and 9 failures. The figures given reveal one

TABLE IV.—*Average Results of Treatment.*

A. *Mild Cases.*

—	Clinician.					Total.
	A	B	C	D	E	
Cases	21	2	20	24	19	86
Successes	15	1	8	24	19	67
Improvements	6	1	12	—	—	19
Relapses	3	—	—	—	—	3
Transferred to hospital	3	—	—	—	—	3

B. *Moderate and Severe Cases.*

—	Clinician.						Total.
	A	B	C	D	E	F	
Treated at home	4	1	4	1	5	—	15 } 47
Treated at hospital	12	5	3	1	3	8	32 }
Successes	8	4	4	2	8	5	31
Improvements	2	—	3	—	—	1	6
Operations	4	2	1	—	—	2	9

fact in a very striking manner. They show the uniform success of the dietetic treatment in the mild cases of nausea and morning sickness, thus supporting the view that in its early stages the condition is a simple lack of metabolic balance and readily controlled. Indeed, so strongly do we feel this, that we believe, once the significance of the condition is generally understood, that pernicious vomiting will become as rare as is eclampsia in those centres where pre-natal care is rigorously insisted upon in the later months of pregnancy. It is not necessary that a woman should spend the first third of her pregnancy in a state of continual or intermittent nausea. Of the three cases given as relapses and requiring hospital treatment two recovered. There is thus a record of failure in mild cases of 1 in 87. It is also of importance to note that, as a result of the treatment and dieting, there were no after-effects of a disagreeable or harmful nature. The babies born of mothers undergoing this treatment were full term and normal in every respect.

Case NN.—This case is extremely interesting, as it shows clearly the influence of the neurotic factor and the value of suggestion in treatment of this condition, with its subsequent failure, unless the metabolic factor is at the same time brought under control. The patient was a young girl, the victim of assault. Soon after the assault she began to be nauseated with frequent vomiting. As this continued a local medical man was called in, who prescribed a mixture of bismuth and soda. Three weeks after the assault the patient had some hæmorrhage with slight uterine pains. As this hæmorrhage occurred at about the date of the usual menstrual period, a diagnosis of pregnant vomiting appeared to be ruled out. Nevertheless, the vomiting continued unabated, and her medical attendant decided to send her to the hospital. This so terrified the girl that it induced a strong reaction in her mind, and she promptly ceased vomiting and recovered, being out of bed and about the house for a few days. Within a week, however, the vomiting had returned as badly as ever and continued for about six weeks. During this time attempts were made to feed the patient on beef-tea and ice-water, but even these were not retained. Also during this period a second hæmorrhage occurred, simulating a second menstrual period. Finally,

the patient was sent to hospital for further examination. The threat of removal to hospital a second time did not produce any improvement in the condition. The patient, when seen in hospital, was rather thin and obviously very nervous. The physical condition was normal, except for some slight evidence of dehydration. The pregnancy was soon discovered and a diagnosis of pregnant vomiting was made. There had been no previous history of vomiting at any time. The urine showed a high specific gravity, a trace of albumin, and large amounts of acetone bodies. She was at once placed upon the routine treatment of water and lactose lemonade to 60 oz., with nutrient enemas 6 oz., glucose 10 per cent. in saline t.i.d., to which was added at night bromide 20 gr., chloral 10 gr. The morning enema was preceded by a soft soap enema.

In spite of the shock of the information as to her real condition, the patient made rapid improvement. She was moved to the isolation ward to give her as much rest as possible, and in two days was able to take a little toast without vomiting. She was also able to take plenty of water by mouth. The slight evidence of dehydration that had been present rapidly disappeared. She showed steady improvement, and was given on the third day a little toast, crackers, jam, and mashed potato. On the fifth day vegetables were added to the diet, and this diet was continued for a further three days. Protein was then added to the diet (a little chicken or fish) in spite of the fact that acetone bodies still continued to be present in the urine. During that time there was practicaly no nausea, but there was occasional vomiting in the early morning. The acetone bodies were present, though only in small amounts, for 22 days. Although the patient had shown such marked improvement and was practically free from any nausea or vomiting, nevertheless, in view of the continual presence of acetone bodies in the urine, enemas were continued for a much longer period than usual, and were not discontinued entirely, though they were reduced in amount until the acetone bodies had completely disappeared. The diet was progressively increased, and the patient was discharged about four weeks after her entry into the hospital. She was seen later and had kept practically free from any nausea or vomiting. During the later stages of her pregnancy she showed a tendency towards uterine hæmorrhage, and in consequence was ordered rest in bed occasionally. She was delivered normally and easily of an 8 lb. baby.

Urine Chart (Case NN.).

Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.	Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.
Feb.					Feb.				
9	500	1027	+	+ + +	21	520	1013	+	+
10	515	1021	+	+ + +	22	870	1013	+	+
11	525	1018	+	+ + +	23	620	1012	+	+
12	840	1013	+	+ + +	24	820	1015	+	+
13	1250	1011	+	+ + +	25	1210	1013	+	+
14	550	1014	+	+	26	400	1016	+	+
15	600	1014	+	+	27	620	1019	+	+
16	860	1011	+	+	28	—	—	+	+
17*	810	1012	+	+	Mar.				
18	580	1014	+	+	1	—	—	+	+
19	970	1011	+	+	2	—	—	+	−
20	980	1010	+	+					

* Protein in diet. Alb. = Albumin. Acet. = Acetone.

Case Bk.—This case represents a failure of the treatment under conditions which were almost hopeless from the commencement. The patient, aged 27, 2-para, housewife, had had her previous pregnancy terminated by Cæsarean section at eight months after continuous vomiting. A living child had been obtained. The patient was extremely thin, ill-nourished, and nervous. No jaundice or epigastric pain was present. Vomiting was frequent, though without nausea. Her present pregnancy was of about two months' standing and the vomiting had started suddenly a week previous to her entry into the hospital, and no food had been taken since. Her private physician had sent her in for therapeutic abortion.

Examination showed a pelvis so contracted that the only possibility of obtaining a living child lay through a second Cæsarean section. The patient was aware of this fact and desired abortion. The urine showed a strong acetone reaction, otherwise it was negative. She was given on the evening of her admittance 1 gr. of codeine, but otherwise no treatment. The following day the routine treatment of 10 per cent. glucose in saline by rectum 6 oz., with bromide and chloral, as in the previous cases in the evening, was given. The vomiting was not excessive. The enemas were well retained, and a fluid intake of 26 oz. was obtained. The acetone bodies showed a very strong reaction in the urine. The next day showed about the same clinical condition as the previous one, though the amount of vomitus was large. The vomiting increased the day afterwards. The patient was looking exceedingly miserable and was now unable to take tea, lemonade, or orangeade. 300 c.cm. of 10 per cent. glucose in saline were given interstitially this day, with ¼ gr. of codeine at the same time, and a further ¼ gr. at night in addition to the usual enemata. This seemed to improve the vomiting for a short time, and the enemata were changed to a 10 per cent. glucose in saline given by Murphy drip, two hours on and one hour off. Codeine was still used at night. There was again a little improvement in the morning, but the afternoon showed great relapse and an operation was decided upon. The day previous to the operation 1000 c.cm. of 5 per cent. sterile glucose in saline were given intravenously. This seemed to effect a little improvement, but did not produce any marked change. No treatment was given the day of the operation. The treatment by nutrient enemata was recommenced the day after. The effect of the operation, as is usual in the majority of these cases, was remarkable. The vomiting ceased and the patient became quite cheerful. She was able to eat small meals of crackers, toast, mashed potato, and a little milk and water. The urine contained just a trace of acetone. The day following she was able to go on a vegetable diet, and following that, meat and chicken were added. Recovery was uneventful. It is to be remarked in this case

Urine Chart (Case Bk.).

Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.	Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.
Jan.					Jan.				
24	—	1032	−	+ + +	30	260	1025	tr.	+ +
25	400	1030	tr.	+ + +	31	525	1023	,,	+ +
26	570	1035	,,	+ + +	Feb.				
27	450	1025	,,	+ + +	1†	—	—	—	—
28	375	1023	,,	+ +	2	1000	1015	tr.	+
29	565	1026	,,	+ + +	3	670	1010	,,	−

† Operation day, no specimen. tr. = Trace.

that treatment by glucose by all ways was unavailing before the operation, and made no effect upon the patient either clinically or metabolically. The acetone bodies and the nitrogen output ran a very irregular course, maintaining a high level. Within 24 hours after the operation very mild carbohydrate treatment was sufficient to abolish all evidences of starvation. It is supposed that the patient's mental condition was such that it precluded all attempts to correct the metabolic errors. The metabolic condition might possibly have been overcome had we used continuous dosages of bromide, much heavier than in any of our other cases, and had we given a series of intravenous injections of glucose.

CASE I.—This again is a very interesting case, which under the old classification would be described as reflex vomiting; nevertheless, it yielded rapidly and easily to metabolic treatment. The patient was 2-para, but the first pregnancy ended in a spontaneous abortion at two months. It had been marked by much vomiting after meals. There was also a previous history of cyclic vomiting as a child. In the present case she had been treated at home without any success by a local physician, and was expecting to be aborted, though she was very desirous of the living baby. Aged 22, two months pregnant, a thin, very nervous woman, the lips cracked, the tongue coated and dry, breath very foul, epigastric pain on pressure. The conjunctivæ, however, were clear. Bimanual examination showed the presence of retroverted impacted uterus. As, however, she was quite comfortable lying in bed the condition of the uterus was not disturbed for a few days. She vomited much during her first night in hospital, but seemed easier in the morning, and took orangeade without vomiting. She was given nutrient enemas, 6 oz. glucose 10 per cent. in saline t.i.d. On account of her very nervous condition, and in view of the possibility that an intravenous or interstitial glucose injection might have to be given to combat the obvious dehydration, bromide, 30 gr., was added to each enema. Water was urged to 60 oz. The urine showed a low volume, high specific gravity, albumin, and acetone bodies. A few casts were also observed. At the end of the first day's treatment the patient seemed much brighter; she vomited once on the morning of the second day. She slept fairly well. The treatment was continued; the second day was marked also by further improvement, and she was able to take a little toast and weak tea for supper without any vomiting. On the third day the epigastric pain had disappeared, and she was bright, cheerful, and hungry. She was given toast and jam. She vomited once in the early morning. Nausea, however, had entirely disappeared, and she was well on the way to recovery. The acetone bodies were present only in traces.

As this case had so far followed the usual course expected during recovery, it was felt that the recovery from nausea and vomiting could be claimed in spite of the retroverted uterus. The patient, unable to retain anything by mouth before her entrance into hospital and before treatment, was enabled in

three days to take small meals in comfort. It was, however, not deemed advisable to leave the condition of the uterus any longer, and an operation was performed. It was found impossible to turn the uterus by manipulation, and consequently laparotomy with the Baldy-Fisher technique was carried out. Gas was used as the anæsthetic. The vomiting, as a result of the operation, recommenced, and continued increasingly for several days. Violent tremblings were also observed. Two days after the operation the nutrient enemas were recommenced with bromide as before. In addition, 1 gr. of codeine was given each night. Although the sedatives brought the continuous trembling under control, the treatment by the nutrient enemas did not improve the vomiting for three days. In fact, it seemed to progress. Six days after the operation, in addition to the enemata, 1000 c.cm. of 5 per cent. sterile glucose in saline were given intravenously. It was followed by a slight reaction. The patient vomited a little the morning after, but not subsequently. The urine rapidly improved together with the clinical condition. Two days after the intravenous injection she was able to take mashed potato, toast, crackers, jam, and jelly, and on the following day was given a little chicken. The bromide was discontinued, and the patient made an uneventful recovery, though there was occasional slight discomfort.

Urine Chart (Case I).

Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.	Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.
May					May				
9	—	1025	+ +	+ +	16	—	1021	..	+ +
10	760	1026	+	+ +	17	—	1030	+	+ +
11	—	1021	+	+	18	—	1022	..	+
12	—	R.U.	—	—	19	—	—	..	..
13					20	570	1012	..	+
14	—	N.U.	..	..	21	550	1008	..	—
15									

R.U. = Replacement of uterus. N.U. = No collection of urine.

CASE C.—This case shows an interesting example of the failure of the treatment in the presence of an active pyelonephritis. The patient, aged 23, 2-para, was two months pregnant. She had been vomiting for about a month to the extent of six or seven times a day, and was unable to keep down even water. Her previous pregnancy had been marked by nausea and a little vomiting, but not to the extent of this one. There was no previous history of bilious attacks or vomiting as a child. Physical examination showed a distinct tenderness over the liver area and also over the left lower quadrant. The uterus, however, was normal. The breath was foul, and the patient complained of a bad taste in her mouth. The tongue was coated but moist, the skin moist and clear, but the lips were extremely dry and cracked. The conjunctivæ showed a trace of bile. The urine did not show an extremely high specific gravity, though acetone bodies were present in large amounts. There was also present a trace of albumin and bile. The usual course of treatment by rectum was commenced and water urged by mouth. This was continued for two days without any improvement. Bromide, 30 gr., was then added to each enema, and on her third day of treatment 500 c.cm. of 10 per cent. glucose were given interstitially. Following this the patient was, if anything, slightly worse. Fluids were urged vigorously, as both skin and mouth began to show signs of dehydration. On the fifth day of treatment an intravenous injection of 1000 c.cm. of 5 per cent. sterile glucose in saline was given, in addition to the usual enemata. There was a slight reaction from the intravenous glucose and the patient vomited a great deal. The day following, however, she seemed much better. The specific gravity of the urine was slowly going down, the acetone bodies had nearly disappeared, and the bile had completely gone. Moreover, her epigastric pain had improved greatly. From this point she seemed to pick up and commenced to feel hungry, and was able to take food such as toast, mashed potato, and jelly. A little chicken was given on the eighth day. On the ninth day the patient had practically ceased vomiting and was enjoying her food. All this time, however, she had been complaining of tenderness in the kidney region, and an examination had shown the presence of a pyelonephritis which now became more manifest. Some slight temperatures developed and the patient complained of aches and pains in the wrists, hips, and shoulders. A bacteriological report showed the presence of *B. coli* in a catheter specimen of urine with the albumin increased. Some days previous to this sodium bicarbonate, 60 gr., had been added to the enemas. This was discontinued and pot. cit., 30 gr. q.4.h., was given by mouth. On account of the pyelonephritis the fluid intake, which had previously been urged to 60 oz. to combat the obvious dehydration, was restricted to 30 oz., but this was later increased to 50 oz., as the signs of dehydration began to make themselves again apparent and the vomiting returned. The vomiting continued again coincidently with the febrile condition. As this latter was brought under control and water and glucose enemata again urged, the vomiting also died down, and for a second time the patient was able to take food. Again, however, the pyelonephritis disturbed the balance and a second attack of fever commenced. Again coincidently with it, the patient became nauseated and vomited frequently. By this time the patient had become greatly depressed and very much weakened, and it was decided to perform therapeutic abortion. In view of the patient's age and the evidently serious nature of the pyelonephritis, it was felt that we would not be justified in pushing the treatment of the vomiting to the necessary extent and continuing the pregnancy. After the operation the patient did not recover with extreme rapidity. She still continued to vomit for three or four days and acetone bodies still appeared in the urine. From that time, however, she improved, the acetone bodies disappeared, and as far as the nausea and vomiting of pregnancy were concerned she recovered. She was transferred to the women's medical ward for thorough examination and treatment of her nephritic condition.

Urine Chart (Case C).

Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.	Date.	Amt. c.cm.	Spc. gr.	Alb.	Acet.
Mar.					April				
31	180	1015	tr.	+ +	14	130	1016	+	+
April					15	220	1015	..	+
1	80	1013	+	+ + +	16	130	1014	..	tr.
2	240	1019	+	+ +	17	—	—	+	—
3	100	1018	+	+	18	—	1017	+	—
4	90	1016	+	+	19	450	1013	+	tr.
5	220	1013	+	tr.	20*	—	—	..	..
6	—	1012	+	+	27	670	1020	+	+ + +
7	460	1010	+ +	—	29	—	Op.	..	..
8	—	1009	+ +	—	May				
9	—	1015	+ +	—	2	800	1018	+	+
10	270	1015	..	—	3	600	1017	+	+
11	350	—	+ +	+	4	500	1012	+	tr.
12	V.S.	—	..	+ +	6	400	1011	..	—
13	600	1016	+	+	7	650	1014	..	..

* No urine collection April 21st to 28th, May 1st, 5th.
V.S. = Very small. Op. = Operation.

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ROYAL MEDICAL BENEVOLENT FUND.—The 87th annual report of this Fund shows the satisfactory nature of the work which has been done during the year, but there is still urgent need for increased financial support owing to the high cost of living and the larger number of applicants. The object of the Fund is to make grants of money to distressed members of the medical profession and their widows or orphans and to provide annuities after the age of 60. For the year ending Dec. 31st, 1921, donations and subscriptions amounted to £3856, or an increase of £461 over those of the previous year; while the amount distributed in grants to 241 cases was £3373, the previous figures being £2768 and 219 cases. The number of annuitants, who are all over 60 years of age, was 178. In connexion with the Fund there is a guild or ladies' branch which supplements the activities of the Fund by visiting and other forms of personal service, by providing clothing and necessaries, by giving extra help in sickness, and by assisting the education of the younger of the beneficiaries.

HAS CANCER A PIGMENTARY ORIGIN?

BY SIR GEORGE THOS. BEATSON, M.D. EDIN., K.C.B., K.B.E.,

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ON Dec. 7th, 1854, in an introductory lecture at Lille to students of technical science, Pasteur spoke as follows: "Without theory, practical work becomes mere routine by force of habit. Theory and theory alone can stir and develop the inventive spirit." To no class of work is this advice more applicable than to the study of cancer, especially if the cases dealt with are of the inoperable type. With them there is, as a rule, but one way, for whether the disease advance with giant strides or with slow and measured step, the result is equally sure and fatal. Hence, in my daily visits to the Glasgow Royal Cancer Hospital, I always kept before me Pasteur's advice and sedulously sought to frame a "working theory" for the malady.

In 1894, when I was first appointed to the hospital as a visiting surgeon, I had a strong leaning to the view that the sex glands had probably a powerful influence on the disease, if they were not actually connected with its origin, an opinion that received some confirmation in 1896 by the very striking results that followed in some cases of inoperable mammary carcinoma which I treated by removal of the ovaries, combined with the administration of thyroid extract. Under this oöphorectomy and thyroid treatment these cases showed a complete retrogression of the disease, together with improved bodily health and with a marked increase in the body fat. All this seemed to me to indicate a possible ovarian origin of carcinoma in women, at any rate of mammary cancer, a view that I see has been again put forward by Dr. Reynes, of Marseilles, in the course of a paper read in March, 1921, before the French Academy of Medicine at Paris. He was led to form this opinion by the case of a woman suffering from inoperable mammary cancer, in which healing and improvement in the general health followed oöphorectomy. An important paper read at the Royal Society, London, on Dec. 10th, 1903, by Prof. J. B. Farmer, Mr. J. E. Moore, and Mr. C. E. Walker, further strengthened me in my "ovarian theory." In that communication the authors announced the fact that the division of the nucleus of malignant cells closely resembles that found in developing reproductive tissue. In other words, the mitotic division was of the heterotype order, and there were only half the number of chromosomes in several of the malignant cells. This observation seemed to me to have an important bearing on the ætiology of cancer and to offer a possible explanation of the beneficial results obtained by oöphorectomy in inoperable mammary carcinoma. Consequently, in a paper published in 1905,[1] I put forward a plea in support of the "gametoid" or, as I termed it, "the germinal (reproductive tissue) theory" of cancer, and I assumed in connexion with it the existence of a general generative secretion from all the body tissues. Under ordinary circumstances this secretion ought to be dealt with by the testes and ovaries, and converted by them into spermatozoa and ova respectively. If, however, by functional decay or disease these organs could not deal with the secretion, then other organs or tissues that had retrograded physiologically, and had reverted to a more primitive type, might utilise it and would produce the cellular growth characteristic both of cancer and of normal reproductive tissue. According to this view, carcinoma had as its origin a tissue secretion that should have been used by the testes and ovaries respectively, and in connexion with which the fat of the body might act as a middleman just as lymph does in ordinary nutrition.

[1] Brit. Med. Jour., April 29th, 1905, p. 921.

Oöphorectomy for Mammary Cancer.

In 1896 I published my first cases of oöphorectomy for inoperable mammary cancer, and since then other surgeons have independently obtained similar good results. In the successful cases the benefits were very marked, being mainly manifest in relief from pain, diminution, and even disappearance of the growth, healing of ulcers, great improvement in health, and prolongation of life. Time eventually showed that nothing in the nature of a complete "cure" could be claimed for the operation, and that in a good many cases it was a failure. Rodman in his "Diseases of the Breast" (1908) gives a summary of Lett's exhaustive study of 99 cases, and the conclusions arrived at were that 41·3 per cent. were benefited by the operation, that the most favourable age for the operation is from 45–50, and that the duration of the improvement varied, ranging from one year of good health in some cases up to four and a half years or more in others. It was further made clear by Lett's inquiries that thyroid extract was not a necessary factor in the treatment. In his Bradshaw Lecture on Cancer, Dec. 7th, 1910, the late Sir Alfred Pearce Gould gave two very typical cases of mammary cancer that are illustrative of the salutary effects of oöphorectomy. In one of them he told us that in May, 1900, the patient was operated on for an axillary growth, which, it was found, could not be removed, and that in September, 1900, when he saw her, the wound in the axilla was unhealed and there was a firmly fixed mass of growth just below the clavicle, while the upper limb was greatly enlarged from œdema. After oöphorectomy the wound quickly healed, the œdema of the arm disappeared, as well as all evidence of the presence of a growth. In conclusion, he said: "I saw this patient last month (November, 1910), after an interval of ten years, and found her enjoying excellent health: the scars of her numerous operations are the only sign that she has ever been the subject of cancer."

Oöphorectomy in Cows to Maintain Milk-supply.

Naturally, one asks, What is the explanation of such a striking result as that recorded above by Pearce Gould? How did the oöphorectomy act? As bearing on this question, let me briefly mention the reasons that led me to try oöphorectomy in inoperable mammary cancer. In 1876, when studying the subject of lactation, I learnt the very remarkable fact that in certain countries it is the custom to remove the ovaries of the cow after calving if it is wished to keep up the supply of milk, and that, if this is done, the cow will go on giving milk indefinitely. Such an effect seemed to me to be of great interest, for it pointed to one organ holding the control over the secretion of another separate organ, in this case influencing the changes in the mammary epithelium associated with lactation. At that time, 1876, nothing was known of "hormones" (Starling), or of "autacoids" (Schafer). All correlation of the bodily functions was assigned entirely to the nervous system, but the result obtained by oöphorectomy in the cow after calving pointed to the possibility of influences being at work that had not at that time been generally reckoned with or recognised. If this was so, the question naturally followed, Did the same correlation exist in the human body? For instance, did the close intimacy between the ovary and the mamma that was apparent in the absence, as a rule, of the menstrual function during lactation amount to a distinct control? It was quite possible that it might and in view of the fact that many pathological changes are merely modified physiological ones, I often said to myself—Is cancer of the female mamma due to ovarian irritation, as from some defective steps in the cycle of ovarian changes? If so, would the cell proliferation be brought to a standstill, or would the cells go on to the fatty degeneration seen in lactation were the ovaries removed? It was this line of reasoning that led me to try oöphorectomy for inoperable mammary cancer. I was further encouraged to do so by some experiments made in 1878 on suckling

rabbits. In them I removed their ovaries during lactation and nursing, and as long as the young ones were at the breast the milk continued. Eventually, when they were taken away, the milk-supply ceased, but the mothers increased very much in size, and post-mortem examinations revealed that this was due to large deposits of fat around the various organs, especially in the lumbar regions where there were masses of pure adipose tissue—showing, it seemed to me, that the secretion of milk was indirectly still going on; not being discharged by the usual channels, it was deposited in the various parts of the body as fat, and took on the form of a tissue formation.

Cellular Nature of Cancer.

To come back to the important question already alluded to—viz., the exact meaning and *modus operandi* of a successful oöphorectomy, in inoperable mammary cancer, the advantage of clearing up this point cannot be over-estimated. A writer on cancer has said "that no doubt the case of the chimney-sweep contains one of the keys to the problem of cancer causation." I consider that the same holds good with a successful oöphorectomy where we have the disappearance of cancerous tissue. That the operation should do this confers on it, in my opinion, a special value, apart from the beneficial effects that may follow it, and I have always kept this aspect of it before me. I have all along felt that it might materially assist in the solution of the cancer problem. If it can in any way help to do this we cannot afford to ignore it, as we must call to our aid anything and everything that will throw light on the ætiology of the disease. Especially is this the case if the procedure in question is one that seems to have a control over cell metabolism or cell proliferation, the two main points round which the problem of cancer centres, for, whatever may be the exciting cause of the disease, it is essentially a *cellular malady* in its origin, in its progress, and in its termination. In every case of the disease it is the cancer cells that bring about the fatal issue. This they do by their numbers, by the power they possess of invading the neighbouring tissues, by their migration to distant parts and organs of the body (metastases), and by their low vitality, for this last feature leads to necrosis of the cells, with its accompanying septic ulceration, suppuration, hæmorrhage, and other disastrous sequels. In view of this, it is upon the conditions that regulate cell growth, metabolism, and multiplication that we ought to concentrate our inquiries in studying the ætiology of cancer. These are the points to which special attention should be directed. As regards the functions of cell growth and cell multiplication, our present knowledge is limited and our views to some extent are theoretical, but of recent years there have been elicited a number of new physiological facts that have an important bearing on intracellular metabolism and cell division, so that there has sprung up a material change of opinion on these matters. Previously the tendency was to assign a good deal of absolute independence to each individual cell, and to credit it with the power to change its nature, or, as it was put, to "revolt" and initiate a line of action of its own. Now we are inclined to modify this attitude and to realise that what we were inclined to regard as individual cell metabolism might possibly be the work of the body as a whole, or of the organ in which the cell was situated.

The New Knowledge of Internal Secretions.

The chief reason for this altered line of thought is the great advance in our knowledge of the so-called "internal secretions" furnished by the endocrine glands for carrying on the special work they do of controlling and regulating the different functions of the body so as to bring them into harmony or correlation. Formerly the recognised idea was that correlation of function was carried on through the nervous system, but we now know that control is also exercised through the blood by means of chemical messages; in other words, that there is a dual arrangement at work in the body, described by Sir Arthur Keith in his fascinating book "The Engines of the Human Body" as a telegraphic and a postal system. The former deals with those functions which have to be exercised quickly, and the latter with physiological processes and metabolic activities, where rapidity of action is not so urgent. The nervous system is the mechanism through which the telegraphic system works, and the blood is the channel through which the chemical messages of the postal system are carried. Many and very varied in their nature are the "internal secretions." Some are only by-products of metabolism, playing a minor part in the correlation of the body's functions. Others form a very important group some of whom set up physiological processes, while others control the metabolic functions. To the former has been applied by Starling the general term of "hormones," while the latter have been named "autacoids" by Schafer in his treatise on the endocrine organs (1916). Of these autacoids some are the sole products of special glands, such as the parathyroid, thyroid, pituitary, and adrenal, while others are secondary products of glands which have other functions to perform. To this latter group belong the pancreas and generative glands. Schafer has also shown that some autacoids may be excitatory, as epinephrin and pituitrin, while others may have a depressing or inhibiting action, as is seen in the substance contained in extract of the placenta. By it the secretion of milk is prevented. As regards the nature of these autacoids, Macleod, in his "Physiology and Biochemistry," has pointed out that though they are the products of glands they are not enzymes. They are of a simpler chemical structure, and, being represented by a comparatively small molecule, are dialysable. Macleod sums up by saying that "an autacoid is a specific organic substance formed by the cells of one organ and secreted into the circulating fluid, which carries it to other organs, upon which it produces effects similar to those of drugs."

Possibility of a Pigmentary Origin of Cancer.

I need not point out what a revolution the above facts have wrought in our views of the working of the bodily functions. When in 1876 I learnt of the Australian practice of spaying cows and of its effects, little did I grasp what it meant, or all that it implied. What I concluded from it was that it showed how one organ could control the secretion of another, but I in no way realised its full import and all that it revealed. This is not to be wondered at, for at that time, as Sir Arthur Keith has pointed out, there had not dawned on physiologists—what afterwards Brown-Séquard was one of the first to foresee—that there had been provided in the body, long antecedent probably to the establishment of its nervous mechanism, a system of chemical inter-communication by which one part of the body, or one of its organs, could establish or control a reaction in another part or organ. When the full scope of the internal secretions was brought home to me, it occurred to me that these new facts might throw some light on the channel by which oöphorectomy worked its effects on mammary cancerous tissue, especially as of late years the conviction has been forcing itself on my mind *that some form of pigment might be the actual exciting cause* of cancer, and that, if this was so, we had an explanation of the effects of oöphorectomy in that disease. Apart from the fact that pigment evidently plays an important part in the "internal secretions," there were other reasons that led me to think that cancer might have a pigmentary origin. The first one was that I frequently observed at post-mortem examinations on some cases of carcinoma a very pigmented condition of the fat, which presented a reddish-yellow vermilion appearance and evidently had in it a colouring matter not usually seen in ordinary fat. A second reason was that in these cases of oöphorectomy in which there had been a complete disappearance of the outward manifestations of cancer after the operation, this disappearance of the

signs of the disease was accompanied by *an increase in the subcutaneous adipose tissue of the body*. This latter result indicated an accession of fat-forming power, brought about by the removal of the ovaries, and it also implied an accession of lipoids, those intracellular fatty compounds which include the lipochromes and have been considered of late years to be of great importance both in cellular metabolism and also in connexion with immunity. The third reason was that an analysis of the fat of cancer patients showed that chemically it differs materially from the fat of non-cancerous persons in that it contains an excess of non-saturated fatty acids, a difference that points to an abnormal activity of the adipose tissue in cancer patients. These investigations were made for me by Dr. W. H. Duncan, now on the staff of the Prince of Wales Hospital, London, and were published in 1911.[2] Quite recently the results were verified by our present biochemist in the research department of the hospital, Mr. A. N. Currie, who has brought out a further point of interest and importance—viz., that there are two distinct manifestations of unsaturation activity, one local in the vicinity of a growth, and the other general, the local being in excess of the general and probably the parent of it.[3] To suggest any relationship between cancer and the fat of the body may seem a very unlikely connexion, but one has only to read the biochemical monograph by Leathes on "Fats" to realise how many useful purposes they serve in the body and that to them must be assigned "a level of biological significance to which heretofore only proteins have been held to attain." One important work fats probably do is to help to build up the protein matter of the body, for the cohesion of the protoplasm of the cells is due to its fats—viz., the lecithin and phospholipin present. In other words, there are "cell fats," and any causes that make them more fluid may lead to their degeneration and destruction. What effects an excess of non-saturated fatty acids in the cells of the adipose tissue of a part may have on surrounding somatic cells is an open question, but it is one that needs further research. The pigmented bodies or lipochromes that exist in fats also enhance their activities, and in many cases they have a nutritive importance, so that they are regarded as manufacturers of fat, forming it through their "chromophores" or pigment cells out of the elements around them.

Natural Uses of Pigment.

Having put forward pigment as the possible exciting cause in the origin of cancer, it is necessary to consider its capability to fill such a rôle. Are there sufficient grounds to justify such a claim being put forward for it? This question is best answered by considering the uses that have been made of pigment in the world of nature. When we do so, we are at once struck by the wide and varied extent to which it has been utilised as a source of energy. Light, composed of its different colours or pigments, each with its own wave-lengths and vibrations, may have been the initial force that set in motion the cosmic ether and by the impulses imparted to it created the various forms of matter and moulded into shape our earth. Be that as it may, we know positively that with the advent of plant life on our globe, pigment was the means by which the vegetation that could not move about to seek and obtain food was provided with nourishment. The pigment employed was the green chlorophyll that gives us the verdure of spring, and by its changes at the fall of the leaf the varying tints of autumn. To it we owe also the sugar, starch, and proteids upon which we all subsist; if the green things of the earth were destroyed human life would cease to exist. The uses of pigment are not, however, confined to the plant life for which it was primarily employed. Such a powerful, vital force was bound to be utilised in the inner working of animal life including the human economy. In the latter, as we know, it takes a share in carrying on the three functions of nutrition, respiration, and excretion, and as a "distillation of the complicated alembic of life" it manifests itself in the complexion and in the various shades of colouring that mark the eyes and hair, by which information is afforded upon racial constitution and personal temperament. Such a wide field of activities and such a record of work shows in pigment a strong potentiality that has to be reckoned with in the human body, not only in the carrying on of its normal functions, but also possibly in connexion with the diseases to which it is exposed. In view of this, it seems to me that one is quite justified in regarding it as the possible intrinsic cause of a tissue malady such as cancer, in which the body is destroyed by the uncontrollable growth of its own cells, of either epithelial or connective tissue.

"Chromatic Function" of Pigment.

With pigment forming such an important factor in its everyday existence, plant life must possess what may be termed a "chromatic function"—that is, the power to produce colour, or, in other words, to manufacture pigments, and this it has. This chromatic function is an attribute of the life of certain specialised cells known as "chromophores," whose molecules contain colour-bearing atoms. These atoms either possess colour or they can produce it when a particular substance known as an "auxochrome" is added to it. This auxochrome is needed to bring out the colour, just as in microscopy a "stain" is needed to bring out the nucleus of a cell. That there are cells with molecules containing colour-bearing atoms or "chromophores" which, by the addition of auxochromes, can be changed into an organic colouring matter or pigment, possessing possibly great potentiality, is a fact of special importance and of considerable moment, looking to the results that might flow from it, for if the auxochrome was an undesirable one the effects might be very harmful. Seeing that the human body also uses pigment in the carrying out of its work, does it possess a "chromatic function" with "chromophores" for its performance? Undoubtedly it does, so that it has pigment at its disposal as an agency for carrying on any ordinary or even special work. An illustration of this latter is seen, I am inclined to think, in the mammary areola, a local exaggeration of pigment which takes place in pregnancy. No explanation has been forthcoming for its occurrence, but I think it quite probable that in the pigment of this areola lies the active agent by which the secretion of milk is set up, the pigment working through the mammary "chromophores." Such an arrangement would be suitable for an organ like the mamma whose functional activity is intermittent, for, in this way, the agent inducing the secretion of milk can be produced when the occasion demands it and can be withdrawn when no longer needed. If the areolar pigment has such a relationship it cannot but have a close relationship with the pathology of breast tumours. The "chromophores," or pigment-bearing cells of the body, are present in various parts, but frequently in epithelial cells and in cells of connective tissue, as in the external layer of the retina, in the posterior surface of the iris, the deeper layers of the cuticle, and elsewhere, as in the nuclear chromatin of all the body cells. Without going into detail, it is sufficient to say that the body pigments range themselves under two headings of the endogenous that are the direct products of cell metabolism or disintegration, and the exogenous, that come from extraneous sources and may enter by the food, especially if furnished by plants or cereals grown on soil fertilised by artificial manures or by human excreta. Pigments vary in other respects, also, especially as regards their solubility, some having little or none, while others are markedly soluble. A special point to be kept in mind in connexion with the action of pigments on the bodily tissues is that they may behave as "dyes," effecting a chemical interaction, so that in the case of the nucleus of a cell they may create *a new nuclear combination* and thus

[2] THE LANCET, 1911, i., 1560.
[3] Journal of Pathology and Bacteriology, 1922, xxv.

give rise to division of the affected cell, a very important point. Of the endogenous pigments not derived from hæmoglobin the most important are the melanins, whose active principle melanin is the substance which gives the colour to the various pigmented regions of the body—as the choroid of the eye, the Malpighian layer of the skin, and the hair—and is present in many pathological conditions, such as in Addison's disease and in melanotic tumours, these latter being in some cases the starting-point of a cancerous process. On this ground, melanins possess a special importance and interest, and have a bearing on the hypothesis I am putting forward. Clinically, I have observed at the Glasgow Cancer Hospital that a very marked proportion of the female patients admitted have dark and often jet black hair.

Having indicated the circumstances that directed my views on cancer into a special line of thought, and weighed with me in coming to the conclusion that we have in some variety of pigment the intrinsic and exciting cause of the disease, it now remains to apply this hypothesis to facts established about the malady. This is essential, for any hypothesis to be of value must stand the test of satisfactorily explaining all the data that have received very general acceptance about cancer. Should it fail to do this it falls to the ground.

Accepted Knowledge Concerning Cancer.

I will begin by taking the chief facts about cancer that are generally admitted. There are four main ones—viz., (*a*) the great antiquity of the disease; (*b*) its occurrence in all races of mankind; (*c*) the unequal susceptibility to it of different races; and (*d*) its existence in all vertebrates. A factor that would meet all the above conditions would require to have been in existence 2000 years before Christ, and Indian manuscripts of that age tell us of the existence of the disease in that country at that date. It would also need to be universal and yet show climatic variations, and it would have to be common to all mammalia and to creatures lower in the scale of animal life. Pigment meets each of these requirements, and I know of nothing else in the human economy that could. Taking next the cancer cell, what are its recognised features? Putting out of court the parasitic theory of cancer, there is general acceptance of the view that some single cell starts the disease; that it is a normal cell of the body with all its attributes; that it becomes possessed of a great power of continuous and uncontrollable multiplication; that it retains its cellular parentage, always breeding true; that it differentiates very little, and if it does so, any differentiation is irregular; that it often exhibits periodicity in its growth; that it influences adjoining cells; and that its development is apparently neither purposeful nor beneficial. The pigmentary hypothesis can fit in with all these characteristics. In the pigment cell, epithelial or connective tissue variety, we have a single individual unit, a normal cell of the body, and in which there lies ready at hand pigment that by intracellular metabolism may undergo change, or may be replaced by some new pathological product. In it, too, *continuous proliferation* may be set up, for if the altered pigment forms a new chemical combination with the nucleus by acting the part of a "dye," then not only will cell division be initiated in the primarily affected cell, but all the progeny of the divided cell will retain that power of division in perpetuity, and continuous cell multiplication will be the consequence. Such a development would be quite in keeping with our present ideas of cell division, for we know that of the conditions which keep cells from dividing, one of the most potent is integrity of the nucleus and of the protoplasmic contents, but if any chemical or physical reaction takes place in them, then division of the cell may result, and, once affected, it may continue indefinitely as the outcome of the permanent change in the nuclear pigment. This will explain the retention by the cancer cell of its original parentage so that it breeds true, and also its want of differentiation and its purposeless development. The continuous proliferation will account for the influence the cancer cell exercises on adjoining tissue cells, of which the stroma formation is a very prominent feature, as is, too, its infiltrating power, which may be caused mainly by want of room pressure or by "dyeing" neighbouring cells and inducing in them such nuclear changes that they in their turn divide.

Transplantation of Cancerous Tissue.

I will next deal with the results that have been elicited by experimental research since its great development dating from 1903, when Jensen announced his discovery in mice of a tumour (adeno-carcinoma) which could be propagated readily by inoculation or transplantation into other mice. This line of inquiry, it must be borne in mind, is not based upon inoculation as we understand it in connexion with an infectious ailment, for what happens is not the conversion of normal into cancerous tissue and the initiation of the disease, but the actual transplantation of ready-made cancer cells into a healthy animal and their subsequent growth *provided the soil in which they have been embedded is suitable.* This experimental work has undoubtedly materially increased our knowledge of cancer, and we have learnt a good deal about immunisation against the disease, about its spontaneous disappearance, and about the very interesting as well as important fact that one type of tumour can change into another—that is to say, an epithelial epiblastic neoplasm may become a sarcomatous mesoblastic one; in other words, that the more virile connective tissue can assert its supremacy over the more archaic epithelial one. Of the facts established experimentally the following are the chief ones: (*a*) Different tumours vary in their power of successful transplantation; (*b*) the various strains of mice do not show the same susceptibility to successful transplantation; (*c*) cancer cannot be transferred to animals of another species; (*d*) the occurrence of spontaneous recovery from transplanted tumours has been noted; (*e*) mice which so recovered could not be successfully re-inoculated by transplantation; (*f*) injection of a tissue similar to the neoplasm caused immunity; and (*g*) the gradual development of a carcinoma into a sarcoma. In addition to these facts reference must be made to a recent line of experimental investigation that has been pursued and has a distinct bearing on the subject-matter of my paper. I refer to the production of tar cancer in mice. In the seventh scientific report of the Imperial Cancer Research Fund there is a communication from Drs. J. A. Murray and W. H. Woglom which relates how the prolonged application of coal tar to the skin of mice produces malignant new growths, their malignancy being demonstrated by their local histological appearances, their progressive enlargement even after tarring has stopped, their power of being transplanted, and their production of metastases in internal organs. As bearing on the ætiology of cancer, such results must be regarded as of special significance, but with pigment as the causal agent of carcinoma, a very likely explanation is supplied, just as I think it may be responsible for the other experimental facts enumerated above.

Predisposing Causes of Cancer.

Again, distinct support is given, I consider, to the pigmentary hypothesis by what are regarded universally as predisposing causes of cancer. Of these age may be placed first, the liability to the disease increasing in every decade after the third. What, then, are the bodily changes that accompany and mark old age? The most pronounced are the whitening hair, the wrinkled skin from loss of subcutaneous connective tissue, and the patches of cutaneous pigmentation that appear, each one and all of them pointing to diminution and disturbance of the body pigment. It is not unreasonable to conclude that when the body pigment is in this unstable condition, it may be the seat of chemical changes, possibly of a nature to affect the nuclei of the chromophores or other cells and by initiating cell division start the cancerous process. In the same way the greater frequency of cancer in

the female than in the male sex may be accounted for by the pigmentary hypothesis as it is due to special liability of two organs of the generative system to the disease—viz., the breast and uterus—organs that we know are subject to irregular functioning, in which pigmentary activity plays a very important part. But of all the predisposing causes to which the greatest weight has been attached as an exciting agent in originating cancer, and that has been most discussed from Virchow's day up to the present time, is what has been termed "chronic irritation." To it much attention has been directed, in the hope that its phenomena might throw some light on the ætiology of cancer, and we are fairly familiar with the tissue changes that occur in it. This chronic irritation is marked by increased cell formation, by changes in the sub-epithelial tissues, and by alterations in intracellular metabolism, but of all the deviations from the normal that, in my opinion, are the most significant, are the variations in the cell pigment described by Lister in his well-known paper on the early stages of inflammation caused by various irritants. He demonstrated conclusively that in the inflammatory area created the tissues were affected first, and the blood-vessels secondarily, and of these tissue alterations the first noted were *changes in the cell pigment*. As he puts it, there was a "suspension of pigmentary functions," the chromatophorous pigment cells losing their concentrating and diffusing power over their pigment content, so that the latter manifested remarkable variations in their relative distribution. Such pigmentary disturbance is an instructive point and cannot be ignored in connexion with the view, that I think is strongly supported by weighty evidence, of "chronic irritation" favouring the development of cancer. Especially are they of importance if pigmentary changes are the exciting cause of this disease. Again, in the case of X rays, which may undoubtedly originate the cancerous process, everything points to their action inducing pigmentary disturbances, for the bronzed and tanned appearance of the skin at the seat of their application, especially in the case of the new symmetrical X ray apparatus, is distinct evidence. Were I to submit to the pigmentary hypothesis other well-known facts, as the occupational cancer of chimney-sweepers, paraffin and tar workers, or the cancer associated with social customs, such as the Cashmere use of the "kangri" or fire-basket, and the chewing of the betel nut, injury, leucoplakia, &c., I would only be quoting instances that are explicable on my theory, but I feel that it is unnecessary to add any further illustrations. Nor do I propose to say anything as to the bearing the hypothesis may have on climate and soil which by many are regarded as having an important influence on the prevalence of cancer in different districts.

Diet.

I would, however, before concluding this paper, like to make a few observations as to the bearing a pigmentary origin of cancer may have on a diet in relation to the disease. Assuming the correctness of the view I put forward, the sources of pigment in the human body have to be considered, and as bearing on this matter we have to remember that the body is an engine which uses its own tissues as fuel and that it is from their combustion all bodily activity and energy is derived. To renew the burnt-up tissues, food is required, and for its supply both the animal and the vegetable world are drawn on. In many of the substances supplied by each of them there occur pigments of various kinds. Under these circumstances, it is quite possible that when these articles of food have been ultimately consumed in the bodily metabolism, the resulting debris may contain grains or particles of pigment which may be retained in the body and utilised or not, as the case may be, or they may be carried away by the excreta. In fact, what takes place is very much what happens when coal is burnt. Not only do we obtain heat from it, but it furnishes tarry matters and aniline dyes with their varied hues or pigments. As to how the vegetable world obtains its pigments, we are safe in saying that they do so from the soil in which they grow. It is the soil that furnishes the ingredients from which the plants themselves work out nutritious material and their own colouring matters; but we have also to remember that in many cases the soils are impregnated with manures and fertilising agents, some of them of coal-tar origin, and these in their turn may be the source of additional pigments of doubtful and possibly harmful nature. May we have in this an explanation of a fact alluded to by Ochsner, of Chicago, in his paper on the Infectivity of Cancer, published in the *Annals of Surgery*, March, 1921? I refer to his statement that there is an enormous amount of gastric cancer in manure-eating people—that is, in people eating raw vegetables growing in soil fertilised with night-soil or with barn-yard manure. In illustration of this he quotes the Japanese as an example. They eat such manure-grown vegetables raw in abundance, and they suffer greatly from cancer of the stomach. On the other hand, he points out that the inhabitants of India, whose religion commands them to boil food and drink, are notably free from gastric cancer. In explanation of the above facts, he takes the view that sewage and manure are the home of the cancer organism. I would rather regard them as the source of deleterious pigments, and learn from them the lesson that we may make our edible plants our bodily enemies by our methods of cultivating them. When we employ human or animal excrement as manures, or coal-tar fertilisers, we may be introducing a source of danger as far as cancer is concerned. In his article Ochsner indicates how strongly he has been impressed by the fact that the Chinese and Japanese, who manure their vegetable gardens with human excrement, are attacked by cancer of the stomach, whereas in the tropics, where human excrement is not used for fertilising garden vegetables, gastric cancer is exceedingly rare.

Conclusion.

In conclusion, I would like to say that I at once admit that I have not been able to furnish anything in the nature of proof in support of the pigmentary origin of cancer that I have put forward, but in the work already mentioned, which Mr. Currie has done in connexion with the fat of adipose tissue in malignant disease, he has brought out some points favourable to it. Mr. Currie leans to the view that fat pigment probably plays an important part in the mechanism of general cell proliferation, and that a high degree of fat pigmentation is accompanied by an increase in unsaturation of the fatty acids, but that there is as yet no definite explanation of how it acts. There is also, he considers, good reason to think that there is a difference in the pigment of normal fat and of circumcarcinomatous fat, and that the fats in the locality of malignant growths are characterised by intense pigmentation. All this points to the necessity for further study of pigments in their relation to chemical and biological processes, both normal and pathological.

It may be said of my hypothesis that it is all pure surmise, and unsupported, but I feel that in this effort to solve the cancer problem by searching for its exciting cause there must be some Sherlock Holmes work and some guessing made. The imagination must be allowed some scope. When Shakespeare makes Hamlet in his frenzy say to his mother:—

> "You go not, till I set you up a glass
> Where you may see the inmost parts of you"

had he prophetic vision of the Rontgen rays, or was he allowing his fancy to have play? It may have been the latter, and we know now that this same injunction is daily heard in consulting rooms throughout the land, and what may have been an imaginative idea has now materialised. Above all, it must not be forgotten that research inquiry is team-work, and that everyone should let his fellow-workers know any new line of investigation that is being carried on and the reasons for it. This duty has largely influenced me in writing this paper to furnish information of the work being done at Glasgow Cancer Hospital Research Department, and I hope in this spirit my communication will be received.

FEVERS OF THE PUERPERIUM.

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A LARGE number of cases of puerperal sepsis, puerperal scarlet fever, and instances of the two diseases running concurrently have during the last few years come under my notice in the Borough of Sunderland Infectious Diseases Hospital. I have recorded notes[1] on these and scarlet fever in the new-born babe, which did not, however, contain more than brief accounts, much interesting matter with regard to symptoms, diagnosis, and complications being omitted. Several correspondents and one or two critics have asked me to provide further particulars; this, and the fact that little can be found on puerperal scarlet fever in the text-books, prompt this article.

Incidence.

As to the liability of parturient women to infection, I have certainly found that when a case occurs in the home under my supervision, only prompt removal and early diagnosis prevents the spread of infection to other women unprotected by previous attack—so much so that a rise of temperature and sore throat lead to isolation of the patient. It would also appear certain that, in those cases where sepsis complicated the scarlet fever, the sepsis was a separate infection; there was no evidence that scarlet fever itself would cause puerperal sepsis, and in my cases of the double infection the source of the septicæmia was traced in each case, and separate onsets were easily made out. The same strain of streptococci was cultivated from uterine swabs and the blood-stream. As regards new-born babies my records show that only two were discharged who did not have any evidence of the disease while in hospital. In three there was evidence of infection in utero; the remainder developed the disease after birth, the appearance of the rash being observed in from a few hours to five days after birth, the pathognomonic sign of the strawberry tongue was present in each diagnosed case, and thorough desquamation was the rule. The symptoms ushering in the disease in these new-born babies were often severe, convulsions being not uncommon; the throat symptoms were prominent, and a death occurred from œdema of the glottis. The pure puerperal scarlet fever ran a fairly mild course, though signs and symptoms were better marked than in other patients admitted from the town, where the disease was at that time of a particularly mild type. The death-rate was nil in the cases uncomplicated by sepsis. The mothers were in most instances able to feed their babies, and the chief treatment was directed to careful attention to the vulva and to any vaginal lacerations. The cases of scarlet fever complicated by sepsis were much more serious and the mortality was 66 per cent. The scarlet fever having developed, a separate onset, with rigors, headache, and thirst followed, and it was observed that the temperature which had been falling by normal lysis swung up to 105° F. or so, and tended to become hyper-pyretic (in fatal cases rising to 107·4°), attended by all the symptoms of grave septicæmia. The vagina and perineum in most cases were very foul and extensively lacerated; septic blotchy rashes appeared, particularly on the face and lower limbs; the pressure points rapidly became red, and, in fatal cases, within a few hours, black. As the disease progressed the temperature chart changed from one showing remissions of two or so degrees to one which swung three or more. A definite septic look is often present while the patient has a definite sense of well-being. These latter two points are very important both in the diagnosis of puerperal sepsis and its onset during scarlet fever. The pure scarlet fever case feels ill and looks ill. The tongue becomes dry, glazed at the tip, and covered with brownish-yellow fur on the dorsum. Delirium is common.

[1] THE LANCET, 1922, i., 1170.

Diagnosis.

When called in to see a puerperal woman with pyrexia, one should immediately endeavour to exclude sepsis, or to diagnose and notify the disease if present. There appears to be a diffidence in recognising its presence unless there is likely to be a fatal issue; thus, notifications are very few in comparison with the actual number of cases undoubtedly occurring at the present time. All degrees of sepsis require early treatment if the women are to escape after-effects, and if the disease is to be kept from spreading; early recognition also means early treatment, which, when thoroughly carried out, reduces the mortality; I myself favour the hospitalisation of all these cases at the earliest moment, especially any cases of pyrexia in maternity homes where the temperature has remained above 100·4° for more than 24 hours or shows a second rise in the dangerous period of the first five days of the puerperium, and where there is no other obvious cause. All rashes must be regarded as of septic origin until proved otherwise; morbilliform rashes are almost certainly septic in the puerperal woman, scarlatiniform rashes are frequently present, and no diagnosis of scarlet fever should be made without presence of the injected throat and double rash. An inspection of the vagina and cervix should be made, and the presence of tears and their condition of cleanliness considered, in coming to the conclusion of the presence of sepsis or the likelihood of it supervening. The lochia, as a rule, show some change from the normal; in most cases they do not completely stop, but they become offensive. The utmost care, in maternity homes at least, should be taken to diagnose the cause of any rise of temperature other than the "reactionary," remembering, first, that there are many abortive cases of puerperal sepsis which may at any time lead to a serious outbreak, or from which complications may arise after the patient has been discharged; and, secondly, that the occurrence of mild sapræmias indicates that something is wrong in technique which, if undiscovered, will almost certainly prove such group of temperatures to be the forerunner of further and graver outbreaks. Care should be taken in choice of nurses; it should never be forgotten that pyorrhœa in a nurse may set up sepsis in her patient. A nurse suffering from septic teeth or throat, or subcutaneous whitlows, must be prohibited from attendance; ozœna should completely disqualify a nurse for practice. Swabs should be taken from uterus and vagina, and an examination of the blood is helpful for prognosis. Any shiver or rigor in a puerperal scarlet fever case should lead to investigation of the uterus and vagina.

Treatment and Complications.

If the patient is seen early, the question of exploration and washing out of the uterus comes up, and good results may be expected; later this procedure is probably disadvantageous, if not, indeed, dangerous. Tears and lacerations of the vagina must be carefully cleaned; vaginal douches four-hourly are both helpful and comforting. Sleep must be obtained. Alcohol is usually required. Yadil in half-ounce doses four-hourly appears useful. Hyperpyrexia calls for cold sponging or the ice pack. Treatment of diarrhœa depends largely on the individual patient. Plenty of fluids should be given.

Pyæmia and local pelvic collections of pus were observed. One woman was very maniacal, and eventually showed abscesses of finger and elbows. Women who have shown even slight rises of temperature during the puerperium should be kept under observation for two months or so; some at least find their way to the infirmaries with local pelvic troubles, or suffer otherwise from ill-health.

I have several times noticed the following sequence of events: (1) Undue prevalence of discharging or watery eyes in the new-born babies—? ophthalmia neonatorum; (2) slight septic conditions of children's nails; (3) subcutaneous whitlows or small blisters on the nurse's hands; (4) mild pyrexias of unknown origin in the puerperal woman; (5) puerperal sapræmia or septicæmia.

A CASE OF OSTEOGENESIS IMPERFECTA.

BY MARY F. LUCAS KEENE, M.B., B.S. LOND.,
READER IN ANATOMY, LONDON (ROYAL FREE HOSPITAL) SCHOOL OF MEDICINE FOR WOMEN.

THE history of the case about to be described is as follows. The mother, a healthy primipara, aged 20, sustained a normal pregnancy until about the end of the eighth month, when she was admitted to hospital, the membranes having ruptured. The child was then alive, but about 48 hours after admission a stillborn female child was delivered. The placenta came away intact, and was found to be very soft and to have areas of caseous necrosis. Unfortunately, it was not preserved and sections were not taken. The family history was good; there was no history of venereal disease, and there were no malformations or deformities in the families of the parents.

Condition of Fœtus after Delivery.—The fœtus was remarkable in that its limbs were extremely short (Fig. 1) and the lower extremities appeared twisted and bent, the vault of the skull was quite soft, and the pinna was not well formed. The shafts of the long bones showed a fibrillated periosteum ruptured in places and containing a pulpy mass consisting of minute islands of osteoid tissue, marrow, and osteoblasts in very large numbers. These cells were much bigger than the normal osteoblast, and appeared, indiscriminately, to be making a sort of fibrous connective tissue, and small masses looking very like cartilage, as well as the islands with appearance of normal bone (Fig. 2). The subperiosteal bone was absent, but here and there a fibrous layer more compact than the periosteum and packed with elongated osteoblasts took its place. The marrow was scanty and contained scarcely any giant cells, but coarsely granular eosinophile cells were present in excess. In the membranous tissue of the vault of the cranium feeble attempts at ossification were detected microscopically, and the ribs were entirely cartilaginous. In the other bones ossification was not as advanced as usual, but the normal centres were present.

FIG. 1.

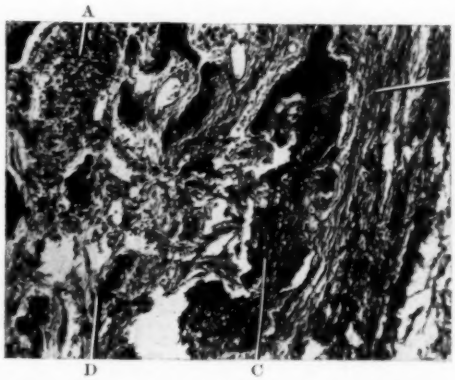
Showing exceptional shortness of limbs in fœtus.

All the organs were examined, and particular attention was paid to the ductless glands, as it was thought that they might throw some light on the cause of the condition. The standard for comparison was based on observations which have been made by me on some 150 fœtuses of various ages—only those which died from accident at birth (contracted pelvis, prolapsed cord, &c.) being considered normal. Amongst other things, these investigations have shown that to a certain extent the thymus varies in weight directly with the state of nourishment of the fœtus. The well-developed baby with a large amount of subcutaneous fat is found to have a thymus weighing from 15–25 g.; the thymus of the emaciated infant, on the other hand, may weigh as little as 1·5 g. The thymus of this abnormal fœtus was peculiar, as it contained a very large number of Hassall's corpuscles, and weighed only 2·2 g., even though the subcutaneous fat was more abundant than usual. The spleen was relatively large, weighing 7·7 g. and exhibiting a marked diminution in the number of Malpighian bodies; in addition, nucleated red corpuscles were found in rather large numbers, together with a few giant cells. Normally, the formation of red blood corpuscles in the spleen is said to cease by the sixth month of fœtal life, and the waning of this process coincides with the development of the Malpighian bodies. Possibly the spleen in this case was trying to compensate for the lack of blood-forming function of the bone marrow, as evidenced by the almost complete absence of giant cells in this tissue. A collection of axillary lymph glands showed a paucity of lymphocytes, and contained some nucleated red blood cells and eosinophile leucocytes. The pancreas had an abnormally large amount of fibrous tissue. All the other organs—namely, the thyroid, pituitary, suprarenals, ovaries, liver, &c.—appeared normal.

Remarks.

The immediate cause of the condition seems attributable to the osteoblasts, which—though showing an immensely increased if somewhat perverted activity—

FIG. 2.



Microscopic appearance, shaft of long bone. A, Bone marrow. B, Fibrillated periosteum. C, Island of osteoid tissue with included osteoblasts. D, Small bony island, surrounded by osteoblasts.

were obviously unable to perform their function normally. Possibly their impotence was due to lack of calcium salts, for the bones, even the bodies of the vertebræ, all cut readily with a scalpel. There was no evidence of an increased absorption of bone—in fact, no osteoclasts were seen nor was there reason to believe that the production of cartilage was at fault. As to the more remote influence controlling the osteogenetic function: whilst recognising that the defect may be due to the necrotic state of the placenta, I venture also to suggest that, in view of the connexion stated to exist between the thymus and calcium metabolism, the association, in this case, of an atypical thymus with faulty production of bone is of interest.

THE USE OF CLAMPS IN GASTRO-ENTEROSTOMY:

A SUGGESTED IMPROVEMENT IN THEIR DESIGN.

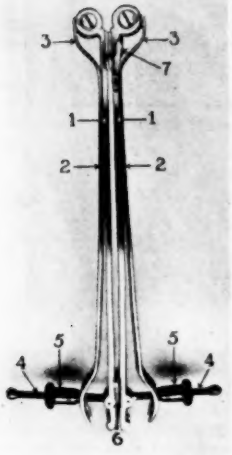
BY NORMAN M. DOTT, M.B., CH.B. EDIN.

THE surgeon is frequently called upon to undertake the operation of gastro-enterostomy. The perfection of its technique is therefore a matter of importance, and on this account the following remarks on the clamps used in the operation may be justified. The types of instrument commonly employed are numerous, and a fair inference from this fact is that none of them give complete and general satisfaction. It is my impression that most operators will support such an inference—often very cordially during a difficult operation. I have attempted to improve this detail of operative technique by having an instrument made to meet the special requirements of lateral anastomosis. It will be of advantage briefly to consider the benefits sought by the use of clamps, the disadvantages their employment may entail, and from these facts to arrive at the mechanical requirements of an ideal instrument.

The benefits which accrue from the application of clamps during a lateral anastomosis are prevention of the escape of infective visceral contents; temporary control of hæmorrhage; and support, in a convenient position, of the parts to be anastomosed. Thus risk of contamination is minimised, the advantages of a bloodless operation field are secured, and rapidity and accuracy in suturing are facilitated.

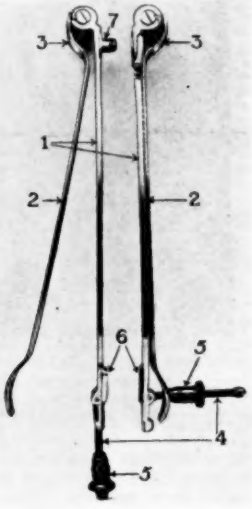
The disadvantages which have been urged against their use are that the larger vessels which have been cut are not obvious and might be missed by the suture, and that the parts adjacent to the suture line may be traumatised by the instrument, leading to delay in healing of the wound or to the formation of

FIG. 1.



The clamp assembled.

FIG. 2.



The two elements of the clamp separated, one open and one closed.

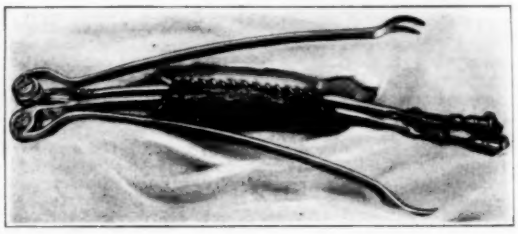
1. The inner, rigid and fixed blade. 2. The outer, flexible and moving blade. Its flexibility is so arranged that when closed it becomes straight and presses evenly at all points. 3. The spring of the outer blade, by means of which it is automatically adjusted to accommodate an organ of any thickness up to ¾ inch, maintaining its parallel position. 4. Screw, which can be folded down in line with the blade in order to withdraw it from under the anastomosis (see Fig. 3). 5. Split milled nut for fixing the blade in position. It slips freely over the thread until it comes in contact with the blade, which is held closed in place with the opposite hand. This contact causes the threads to engage, and half a turn suffices to lock it. It is very expeditious in use, and a finer adjustment can be made than with any form of rachet. The device is largely employed on engineers' callipers, &c., and is therefore easily obtainable should replacement be necessary. I have been surprised at its durability. 6. Sliding dove-tail attachment for fixing the two parts together. 7. "Patent fastener" clip which completes their approximation.

peptic ulcer in its neighbourhood. The former objection involves the question of the employment or discarding of any form of clamp, and does not concern me here. It may be mentioned, however, that most authorities consider that a properly applied suture controls the vessels with certainty, even though they cannot be localised; they therefore avail themselves of the advantages of the instrument. The second objection—that of trauma—demands attention. Gross injury has been recorded, an actual wound of the mucosa by crushing leading in one instance to fatal hæmorrhage.[1] It has been shown by Wilkie,[2] Flint,[3] and others that practically always the mucosal suture line is successively the site of an acute spreading ulcer, a granulating surface, a healing ulcer, and finally of a fibrous scar covered by a single layer of regenerated epithelium. Trauma at or adjacent to the suture line causes primarily an ulcer of greater extent, depth, and duration, and secondarily more fibrosis, a wider scar, and therefore a wider area of avascular and poorly epithelised tissue. Such a condition constitutes a permanent predisposing factor to continued or subsequent ulceration. If the trauma inflicted by a clamp were severe in degree a similar condition would be produced at its site of application. Among the possible ætiological factors of gastro-jejunal ulcer the injurious effect of anastomosis clamps has been frequently cited, notably by Hartmann. In opposition to this view, it has been pointed out that the ulcer usually develops at the suture line—not where the clamps are applied—and that it is almost always a comparatively late post-operative complication. However, a consideration of the ætiology of peptic ulcer (a primary lesion, bacterial, toxic, traumatic, neuritic, or otherwise, seconded by the destructive action of the gastric juice), and of the pathology of the healing gastro-enterostomy wound, forces one to the conclusion that the injury inflicted by anastomosis clamps may be responsible, in some cases, for delayed healing of the mucosal wound, and for secondary ulceration. Such ulceration would occur most frequently at the suture line (gastro-jejunal), and at the site of application of the clamp (jejunal or gastric) only in case of very severe injury. A frequent feature of these ulcers is the chronic inflammatory condition of the whole circumference of the stoma, leading to contraction of the opening and dense external adhesions all round (Carman and Balfour[4]). Such a condition points to an influence affecting the whole suture line. While it can be equally well explained by the simple trauma of incision plus hyperacidity, by the use of unabsorbable suture material, by the mechanical injury of unsuitable food, &c., one is bound to consider the injury inflicted by clamps as a very possible predisposing cause to a lesion with this distribution.

Ideal Requirements.

From what has been said I infer that the use of clamps is justified, but that it is important that every precaution should be taken to reduce to a minimum their possible injurious effects. The requirements of an ideal instrument are the even distribution of a pressure sufficient to occlude the blood-vessels and the lumen of the organ, and no more; a gripping surface which will hold the organ securely with a minimum of pressure of the blades and without injury to the outer coats; and twin clamps capable

FIG. 3.



The instrument in use. The anastomosis has been completed; the set-screws are turned down, and the blades are open ready for withdrawal.

of close and rigid attachment to each other. Further desirable features are facility in adjustment, convenience in size and form, simplicity, and durability.

The figures illustrate an instrument in the design of which an attempt has been made to carry out these principles. As regards comparison with the usual forms of clamps, when the latter instruments are employed undue crushing is liable to be caused at the joint end, while insufficient pressure permits both clipping and bleeding at the distal parts. These serious defects are overcome by the clamp I describe. Experimentally, I have found that a finely but sharply roughened metal surface meets the requirements best. Smooth, fluted metal surfaces or rubber-covered blades necessitate excessive pressure in order to hold securely. Coarse serrations or fine teeth hold well, but there is danger of injury during a difficult operation.

The two clamps are entirely independent, an advantage over the three-bladed types, in using which difficulty may be experienced in securing the second viscus, and under these circumstances a distorted

hold is more liable to be taken. It has been found more easy of application than clamps with handles, especially in the absence of assistance. One end of the selected loop is caught at the spring end of the blade; the remainder of the loop can then be stretched out while the blade is closed on it. The absence of handles, which are in the way and tend to drag on the parts, is of itself an advantage.

It weighs about 140 g., while the approximate weight of other typical instruments is 250 g. The working surface of the blades is 14 cm., as compared with the average 12·5 cm. The overall length is 20 cm., as against about 34 cm. The blades are gently curved. The convexity is directed into the abdomen should free delivery of the viscera be difficult; otherwise it is turned upwards, giving better access for suture. The laterally projecting screws prevent the instrument from rolling when the parts are fixed together.

Made entirely of steel, and silver-plated, it is perhaps rather more delicate than the average instrument. The screws and joints require thorough drying and a little oil when laid aside. It has stood the severe test of four years' constant use in hospital well, and any clamp should have the above-mentioned attention.

Messrs. Hurford and Drysdale, of 101, Lauriston-place, Edinburgh, have made the instrument for me, and I have pleasure in acknowledging their skill and care in meeting my requirements.

References.—1. Coffey, R. C.: Quoted from Moynihan's Abdominal Operations, 1914, 205. 2. Wilkie, D. P. D.: Edin. Med. Jour., 1910, v., 316–327. 3. Flint, J. M.: Ann. Surg., 1917, lxv., 202–221. 4. Carman, R. D., and Balfour, D. C.: Jour. Amer. Med. Assoc., 1915, lxv., 227–237.

Reviews and Notices of Books.

THE PRISON SYSTEM.

English Prisons under Local Government. By SIDNEY and BEATRICE WEBB. With Preface by BERNARD SHAW. London: Longmans, Green and Co. 1922. Pp. 261. 15*s.*

English Prisons To-day: being the Report of the Prison System Enquiry Committee. Edited by STEPHEN HOBHOUSE, M.A., and A. FENNER BROCKWAY. London: Longmans, Green and Co. 1922. Pp. 728. 28*s.*

Penal Discipline. By MARY GORDON, L.R.C.P. & S. Edin., L.F.P. & S. Glasg.; late H.M. Inspector of Prisons, and Assistant Inspector of State and Certified Inebriate Reformatories. London: George Routledge and Sons. 1922. Pp. 238. 7*s.* 6*d.*

THE first two of these volumes, though appearing under distinct titles, are linked together by a community of origin and purpose. Though its value as a well-documented record of work in this field of sociological inquiry is fully recognised, from our point of view the volume by Mr. and Mrs. Webb is of subsidiary importance to the companion volume, in which Mr. Hobhouse and Mr. Brockway have summarised the results of an inquiry carried out under the auspices of the Labour Research Department into the working of the prison system in this country. These fill a bulky tome of over 700 closely printed pages, wherein is included an account of prison conditions, probably more detailed and circumstantial than has ever appeared in the voluminous literature of penology. The Report suffers in fact from the excess of detail, and it might perhaps have been made more effective by judicious compression. Reasonable criticisms directed to defects in prison regime lose force if undue prominence is given to patently trivial grievances. The main points in the Committee's case against the existing prison system is that it is mechanical and inelastic, that it develops a tendency to day-dreaming and morbid introspection, that it destroys individuality and initiative, and that it does little or nothing for the intellectual and moral education or for the industrial training of the prisoner. The facts set out in the Report certainly go to show that the elaborately organised English gaol is a clumsy, expensive, and in many respects a rather absurd institution. It must be remembered, however, that some of the silliest features of the system have their origin in the well-intentioned activities of earlier generations of philanthropic reformers. The authors rather overestimate the objectionable features of the prison regime when they seek to make them responsible for such phenomena as criminal recidivism and the excess of suicide and insanity amongst convicted prisoners as compared with the general population. Recidivism is a characteristic of criminality in all countries and under all varieties of prison administration. The same bias vitiates the conclusions of the Report on the question of suicide and insanity in prisons. The Enquiry Committee have not succeeded in producing any fresh evidence to modify the well-established view that, in prison insanity, the causal relation is not between punishment and madness, but between madness and crime.

The real ground on which the English prison system is open to criticism is not, then, that it is partly punitive, nor even that its methods are frequently absurd—as shown, for instance, in its fetish worship of cellular confinement and silence, inherited from the spiritual ancestors of the Enquiry Committee. It is that imprisonment has become the sole mode of punishment, instead of being the ultimate or penultimate resource of society in dealing with its responsible criminals. This defect has been recognised to some extent in the legislation of the last quarter of a century, notably in the Probation of Offenders Act (1907), and in the Criminal Justice Administration Act (1914), which latter enactment provided, inter alia, for the granting of more time to pay fines. But there is obviously room for much more progress along these lines. It should be practicable, for instance, to establish a system of fines payable, not in money, but in labour, to be performed by the offender after the hours devoted to the pursuit of his ordinary avocations. A procedure involving this principle was adopted during the war in the case of persons temporarily exempted from military service, and it would seem to be at least equally appropriate as a means of making the lawbreaker pay his debt to the community. Such a modified revival of the corvée would have the advantage over the ordinary money fine that it would not penalise the offender's family, and that it would reach the wealthy delinquent who, under the present system, gets off practically scot-free when his misconduct is of minor degree.

The way to a solution of the problem of criminality so far as any solution is possible, is to be sought, not in tinkering with the details of a prison "system," but in providing alternatives to imprisonment, and in removing or abating the causes of crime. In relation to this second mode of action, the recent history of drunkenness in this country should be an object lesson to the reformers who pin their faith to institution "systems." Drunkenness is the offence which makes the largest contribution to the prison population; and it is also that which shows the highest rate of recidivism. For years the only method of dealing with it was by the utterly useless one of fine and imprisonment. Then the experiment of prolonged institutional care was tried, but inebriate reformatories gave no better results than the old prescription of five or seven days. This was the position up to 1914, when the convictions of women for drunkenness numbered 37,311; after that the enforcement of a rational system of liquor control brought the figure down to 7222 in 1918—a result which would certainly not have been achieved through any application of curative and educational methods in the most perfect of prisons. To point to these considerations is not to minimise the importance of prison reform. Alternatives to imprisonment must depend largely

for their efficacy on the fact that they have behind them the threat of the severer measure of privation of personal liberty. It is obvious that prisons should be organised on more intelligent lines than they are at present, and the Enquiry Committee have done good service by directing attention to the defects of the existing system.

The sane and temperate criticisms of the prison system in Dr. Mary Gordon's "Penal Discipline" are even more valuable. Writing with the inside knowledge derived from ten years' experience as an inspector of prisons, Dr. Gordon is as unhesitating as the Enquiry Committee in her condemnation of our present methods, but her practical experience has preserved her from the illusions of the philanthropic amateur. The most striking feature of the English prison system is, in Dr. Gordon's view, that it applies a uniform method to a heterogeneous collection of offenders, for most of whom imprisonment in any form is a ludicrously excessive procedure. Because it is more or less clearly recognised as inappropriate, it is given in very small doses. The local prisons, in which petty offenders serve their time, may contribute to the corruption of the young, but for the bulk of the prisoners their brief sojourns have no particular effect, good or bad; discipline consists mainly in the enforcement of such rules as are necessary for the peace, well-being, and safety of the inmates. It is under the highly specialised developments of imprisonment, in the convict prisons and in the Borstal institutions, that Dr. Gordon finds the actively mischievous effects of penal discipline. The Borstal system, in particular, is, in her view, an effective agency for promoting mental repression with consequent failure of adaptation to life. Dr. Gordon's criticisms of the Borstal discipline certainly call for inquiry on another count, for the system is a costly one.

Amongst the measures of reform which she advocates, Dr. Gordon lays special stress on the use of alternatives to imprisonment, particularly by way of the deferred sentence, and on adequate psychiatric examination of convicted persons. When by the application of these means the cases requiring penal detention are reduced to a manageable number, prisons might be reorganised on common-sense lines. Finally, as essential to any effective reform in the treatment of the criminal, she emphasises the importance of substituting the spirit and methods of medical science for the rigidity of military and bureaucratic "systems."

It may be hoped that, in the event of a Royal Commission being appointed to investigate this question, its terms of reference will not be limited to an examination of the mere details of prison administration, but will cover the wider issues of the problem on which Dr. Gordon's suggestive book throws light.

PSYCHOLOGY OF MISCONDUCT, VICE AND CRIME.

By BERNARD HOLLANDER, M.D., late Physician, British Hospital for Mental Disorders and Nervous Diseases. London: George Allen and Unwin. 1922. Pp. 220. 7*s.* 6*d.*

Dr. Hollander says in his introduction that this book contains the results of his reflections on 20 years' practice in mental and nervous disorders. It is difficult to find what principles have guided these reflections. The first chapter calls for a "delicate psychological analysis" to unravel causes of misconduct; then follow descriptions of aberrations of human conduct, with platitudes about motives that any efficient journalist could evolve. Treatment includes hypnosis, and cranial operations based upon a functional topography the evidence for which is to be found in the author's book "In Search of the Soul." His methods of delicate psychological analysis are not revealed, though he speaks of "having taken stock of the patient's mind and assessed its various contents at their proper value" (p. 212)—a claim by which the value of his book may properly be judged.

HANDBOOKS ON CANCER.

New Growths and Cancer. By SIMEON BURT WOLBACH, Professor of Pathological Anatomy, Harvard University. London: Humphrey Milford. Cambridge: Harvard University Press. 1922. Pp. 53. 4*s.* 6*d.*

THIS lecture, the tenth of the "Harvard Health Talks," is a fit companion to Dr. Lord's monograph on pneumonia which was reviewed recently in these columns (p. 385). The necessity for condensation has resulted in the omission of much romantic material of experimental and historical interest which the lecturer must have been sorely tempted to include. It is, indeed, remarkable how completely, by this self-denying restriction, the field of our present understanding of the cancer problem has been covered in these few pages. The biology of cell-division, the nature of neoplasms, the causation of cancer in particular, and the present possibilities of prevention are discussed suggestively and yet with due caution. Prof. Wolbach believes that most, if not all, of the apparent increase of cancer mortality in recent years is due to improved diagnosis. If this booklet has the circulation which it deserves it will contribute to the reduction of that mortality in the future both by discrediting "quack" remedies and by encouraging early application for treatment in the only quarter where treatment is likely to be efficacious. Two admirable microphotographs assist greatly the presentation of the subject.

Cancer: Its Cause, Treatment, and Prevention. By ALEX. THEODORE BRAND, M.D., C.M., V.D., Physician, Driffield Poor-law Infirmary; late Major, R.A.M.C. London: John Bale, Sons and Danielsson, Ltd. 1922. Pp. 120. 8*s.* 6*d.*

IN this small book Dr. Brand has reproduced a series of addresses delivered by him at various dates since 1902, mostly before branches of the British Medical Association. He is a whole-hearted believer in the infection theory of the causation of all varieties of cancer, and he states his opinions with clearness and confidence. If we find little in it that is new we must admit that it is a strong presentment of the case, and the personal experiences of Dr. Brand are set forward in a convincing manner.

In his attempts to demolish the arguments of his opponents the author is in a weaker position, and when we turn to the question of treatment and prevention we are disappointed. It seems doubtful if notification of cases of malignant disease is likely to help much. Dr. Brand has little to say on the question of education of the public in the early signs of cancer. In the present uncertain state of our knowledge this is surely one of the directions in which preventive treatment is best calculated to make progress.

DIABETES MELLITUS.

A Clinical Treatise. By MARCEL LABBÉ, M.D., Professor of General Pathology at the Faculty of Medicine, Paris. Translated, revised, and edited by CHARLES GREENE CUMSTON, M.D., Lecturer at the Faculty of the University of Geneva. London: William Heinemann, Ltd. 1922. Pp. 382. 18*s.*

THIS is a translation from the French of the book written by Marcel Labbé which has already been reviewed in these columns. The preface states that four chapters have been added by the author and three by the English editor. The book as a whole suffers from the serious defect that the different chapters are really clinical lectures or papers which have nearly all been published before. This system involves much repetition. The new chapters added by the English editor fill up some of the gaps in the original French edition. Labbé divided diabetics into two main groups, those without wasting who do very well with simple reduction of carbohydrates, and those with wasting who do very badly. The main reliance in treatment is still placed on the principles of

Bouchardat. The fasting treatment is still very little used in France, and Labbé, who is now using it, does not really speak well of it. The actual details of his treatment are not given, but the two main principles recognised in this country—(1) to underfeed, and (2) to avoid the excretion of sugar—seem to be largely neglected. The chapters on the rare conditions such as bronzed diabetes, diabetes with acromegaly, diabetes with exophthalmic goitre, xanthochromia in diabetes are valuable. The translator has done his work moderately well, though there are some surprising errors. An index is appended, but a book on diabetes also needs a list of diets and caloric values.

A SYNOPSIS OF SURGERY.

By ERNEST HEY GROVES, M.S., M.D., B.Sc. Lond., F.R.C.S. Eng., Surgeon to the Bristol General Hospital; Professor of Clinical Surgery, Bristol University. Bristol: John Wright and Sons, Ltd. 1922. Pp. 621. 17*s.* 6*d.*

Mr. Hey Groves has revised and brought thoroughly up to date his popular synopsis of surgery. An immense amount of information is condensed between the covers of this useful revision book. It requires considerable mental concentration to derive the maximum benefit therefrom, since sentences are contracted to pregnant words. The meaning is, however, always clear, and the ruthless elimination of useless information adds to the value of the volume as a condensed record of modern surgical theory and practice. It will continue to be popular with the student in his last months before graduation.

PHOTOGRAPHY IN COLOURS.

Fourth edition. By GEORGE LINDSAY JOHNSON, M.A., M.D., B.S., F.R.C.S. London: George Routledge and Sons, Ltd. 1922. Pp. 318. 7*s.* 6*d.*

THIS new edition of an excellent book gives a concise history of colour photography and printing from their earliest beginnings, and is a complete compendium of the theory, practice, difficulties, and defects of the various processes. All the well-known processes are considered, and in addition full descriptions are given of the Raydex process, Gaumont's new method of cinematography in colours, Carrara's method of reproducing autochromes on paper, along with chapters on art in colour photography, photomicrography in colour, and S. H. Williams's new process for three-colour prints from a single exposure. The bleach-out process is also fully described, with complete and practical details of printing in Uto paper.

The author pictures and describes the remarkable similarity between the coloured starch grains of the Lumière plate and the coloured oil globules in the retina of the tortoise. He goes on to suggest a reason for the colour of the fovea:—

> In taking a photograph through any kind of colour screen plate, it is necessary to restrain the intense action of the blue-violet rays by placing a yellow colour filter in the path of the rays in front of the screen. In our own eyes, and in those of all other vertebrates, we have a yellow colour filter interposed for the same purpose throughout the entire extent of the retina. This occurs in the narrow meshed plexus of the capillary vessels which lies immediately in front of the sensitive layer. The only exception is at the fovea—i.e., the tiny pit at the centre of the macula or yellow spot as it is called. Here there are no blood-vessels, and nature therefore has placed at this spot a yellow pigment behind the sensitive layer which serves the same purpose even more effectively. If there were no yellow pigment at the macula, when looking at a white sky or white surface we should see a blue-violet disc projected in the line of regard in front of our eyes, corresponding to the non-vascular area in the centre of the visual pit.

Another interesting suggestion made by the author is that instead of using a three-colour process (red, green, and blue-violet) manufacturers should add a fourth colour—yellow—which, from an optical as distinct from a physical point of view, should be reckoned as a primary colour. The book will be read with pleasure and profit by every doctor who is a photographer.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT GLASGOW.

(*Continued from p. 622.*)

SECTION OF OPHTHALMOLOGY.

WEDNESDAY, JULY 26TH.

Mr. A. S. PERCIVAL (Newcastle-on-Tyne), President of the section, briefly welcomed the members and expressed the hope that the discussion would prove worthy of the great city in which they were met.

The Ætiology of Optic Atrophy.

Dr. C. O. HAWTHORNE (London) reviewed the causes of optic nerve atrophy in a series of groups. After alluding to trauma in the shape of penetrating wounds of the orbit, optic nerve tumours, intra-orbital cellulitis, periostitis, and of the rarer agents, such as electric discharges, lightning, eclipse blindness, and the like, he pointed out that when the injury does not implicate the skull, or if applied to the skull does not cause fracture in the anterior fossa, both failure of vision and atrophy may be delayed and an acute legal issue may be raised. With regard to poisons Dr. Hawthorne asked whether modern preparations of organic arsenic were free from the risk of optic atrophy which characterised their predecessors. A few cases of central scotoma following inorganic arsenates had been recorded, but the speaker had never seen any reason to believe that the use of inorganic arsenic implied any danger of optic nerve atrophy. He asked, further, whether it was general to suspect patients with a bilateral central scotoma as possible examples of disseminated sclerosis or tabes dorsalis? The sphere of influence of syphilis is a wide one. In the hereditary form optic atrophy may be part of a widespread choroido-retinitis or be associated with disseminated choroiditis or be the sole ophthalmic lesion with, perhaps, other signs of infection in other members of the family. The onset of juvenile tabes, like that of interstitial keratitis, may be delayed to the third or even the fourth decade. In acquired syphilis both post-neuritic and primary optic atrophy may occur. The former is a rare event in the early stage of the disease; in later stages it suggests intracranial gumma or syphilitic meningitis. Primary optic atrophy in tabes and general paralysis of the insane is invariably bilateral, though at an early date the eyes may be unequally affected. It progresses to complete blindness. The onset is associated with peripheral contraction of the fields and occasionally a central scotoma. Instances of hemianopia have been recorded. Spinal symptoms may follow at an early date or be delayed for years. Optic atrophy is said never to precede loss of the knee-jerks or lightning pains in the lower limbs, but this, Dr. Hawthorne thinks, is not strictly correct, and he suggests that in cases with a positive Wassermann reaction even with evident knee-jerks, either optic atrophy, an Argyll-Robertson pupil, or an ocular paralysis may be the first announcement of para-syphilis of the nervous system.

Apart from Mr. Herbert Fisher's suggestion that Leber's familial optic atrophy may depend on pituitary enlargement, it is recognised that pituitary tumours may cause primary optic atrophy accompanied by bitemporal hemianopia. Dr. Hawthorne quoted a case in support of the statement that intracranial tumours other than pituitary growths may also cause primary atrophy. Referring to a group of cases found mostly in young adults and characterised by bilateral optic atrophy, usually post-neuritic, with blindness and the history of an earlier illness suggestive of intracranial pressure but resulting in good recovery, Dr. Hawthorne suggested that these are cases of intracranial tumour, that the tumour has become quiescent, and that the post-neuritic atrophy is the one persisting effect. In cardiovascular diseases optic atrophy most commonly results from thrombosis in the central artery of the retina. The patients are usually elderly and there is not always a high sphygmomanometer

reading, though this does not exclude arterial degeneration. Is embolism of the retinal arteries in patients not the subjects of cardiovalvular disease or of arterial degeneration due to arterial spasm, the "retinal epilepsy" of Hughlings Jackson? Dr. Hawthorne thinks that these are cases of true embolism and that the obstructing clot is provided by intracardiac thrombosis in patients suffering from chlorosis, and that, further, they probably occur in other organs also—e.g., the spleen and kidney, without causing obvious symptoms. Retrobulbar neuritis may proceed to optic atrophy or undergo resolution with full restoration of vision. It may be associated with and be the earliest symptom of widespread nervous disease such as acute myelitis or disseminated sclerosis. As a rule some measure of recovery of vision results but recurrences are not infrequent. Uncomplicated retrobulbar neuritis may be followed, it may be, after many years, by the development of disseminated sclerosis, but, on the other hand, may commence at an age when disseminated sclerosis is no longer probable.

Mr. J. HOGARTH PRINGLE (Glasgow) read a paper on

Atrophy of the Optic Nerve following Diffused Violence to the Skull.

The theory current at the present time, he said, is that of Berlin—viz., that monocular blindness following diffused violence to the skull results from direct injury to the optic nerve in the form of compression, cutting, or tearing of its fibres at the foramen opticum in consequence of fracture involving the foramen or the bone in its immediate neighbourhood. Berlin's theory is based on the findings of Hölder, who found fracture of the base in 88 out of 126 post-mortem cases of fracture of the skull. In 80 of these the fracture involved the roof of the orbit and in 54 the optic foramen. Of these 54 cases 42 were the result of gunshot injury, so that it is not surprising that fissures of the optic foramen and tearing of the nerve were so frequent. Mr. Pringle believes that this form of blindness results from hæmorrhage into the nerve sheath in the majority of cases and that direct nerve injury by bone lesions is a rare occurrence. At the Glasgow Royal Infirmary he has treated 395 cases of undoubted fracture of the skull and at least an equal number in whom there was no fracture or in whom its existence was uncertain. Of this latter class not one suffered from this form of blindness. Of the 395 certain fractures 186 recovered and only one had loss of vision after the accident. This man was trephined in 1902 for an open depressed fracture and vision in the affected eye rose from perception of light only to 3/60 in some weeks, and it remains the same at the present time. Of 209 patients who died post-mortem examination was made in 174 and only 13 showed a fracture involving the optic foramen. Two of these had the upper margin of the foramen fractured, one with, the other without, displacement of the fragment, but in neither case was there injury to the nerve nor hæmorrhage into the sheath. The anterior clinoid process was fractured in only six subjects. In only one of these was the optic foramen involved and the nerve was not compressed nor was there hæmorrhage into the sheath. Hæmorrhage into the sheath of the optic nerve, on the other hand, was present in 16 cases (in 10 in both nerves, in 5 in the right, in 1 in the left). In one case both sheaths were distended with blood and there was hæmorrhage into the substance of the right nerve, but no fracture near the orbits or optic foramina. None of these patients was conscious at any time while under observation, so it is not possible to say whether vision was affected or not.

The hæmorrhage may be derived from (1) the subdural cranial space, (2) rupture of vessels passing between the nerve and its covering, and (3) the central vessels of the retina, which run inside the sheath for a short distance before entering the nerve substance. Of the 16 cases with intravaginal hæmorrhage, there was blood in the subdural space in the mid-fossa of the skull and in the proximal part of the nerve sheath in eight cases, but in seven cases the blood was only present in the orbital portion of the nerve. It seems certain from the specimens that the hæmorrhage *begins* at the distal end of the nerve close to its entrance to the eye. Further, in two of these cases there was no fracture of the orbital roof or optic foramen on either side, proving that a hæmorrhage into the optic nerve sheath may arise from rupture of blood-vessels within the sheath as a result of the varying tensions produced in the orbital tissues by the violence. Thus, there is no reason to doubt that an intravaginal hæmorrhage can result from violence applied to the head even though a fracture of the skull is not produced.

Mr. Pringle had operated on three typical cases, in one of which he is convinced there had never been any fracture of the skull and he is dubious of its existence in the other two. In each blood under tension was found in the optic nerve sheath. All three came late for operation—two weeks, four weeks, and three weeks respectively, and none of them recovered vision while under observation. One patient, who declined operation, noticed no visual defect till the morning after the accident, had no perception of light in the affected eye a day or two later, but two months afterwards his visual acuity in the left eye was 6/24. The sequel of events is consistent only with effusion, most probably blood, and suggests that early relief of tension by operation might be very beneficial in similar cases.

Dr. H. M. TRAQUAIR (Edinburgh) opened a discussion on the

Clinical Differentiation of the Various Forms of Optic Atrophy.

As any lesion or defect of nutrition affecting the ganglion cells in the retina or their axones at any point produces functional impairment and, if severe and prolonged, atrophy spreading up and down along the neurone, it is easy to understand how the visual failure precedes the pallor of the disc by an interval the length of which depends on the site and nature of the lesion. It is probable that the lesions are of two kinds: (1) Toxic, acting on the ganglion cells in the retina and producing ascending atrophy; (2) nutritional impairment of nerve fibres producing both ascending and descending atrophy and depending chiefly on inhibition of the blood-supply by processes inflammatory, vascular, or mechanical. The symptoms of conduction interference in both classes are fundamentally the same. Of the several methods of investigation available the examination of the field of vision provides information that is unobtainable in any other way. By this means the conductivity of the nerve fibres and the site of interference may be investigated and inferences drawn as to the nature of the lesion and its rate of progress.

Perimetry has two aspects—the technical and the interpretative. In regard to the first, it is important to employ a wide range of test objects graduated as to size and to use a serially graduated red colour in addition to white. The arrangement of the nerve fibres in the retina must be borne in mind. They are arranged radially on the nasal side of the optic disc, and on the temporal side in an arching formation around the macula, those of the upper retinal quadrant being separated from those of the lower by a horizontal raphé extending from the macula to the periphery. A vertical line passing through the fovea divides the fibres into crossed and uncrossed, the former being partly radiating and partly arched, the latter entirely arched. The arrangement of these fibres in the nerve, the characteristics of the blood-supply, and their relationship to the post-nasal sinuses and other structures must also be kept in view.

The field changes observed may be regarded as falling into two main classes—peripheral or concentric contraction and changes corresponding to nerve fibre bundles, including scotomata. Peripheral contraction does not mean that the central area is unchanged; quantitative testing shows that it is usually also affected, and that there is some depression of the visual acuity of the whole field. Nerve fibre

bundle defects are the reflection in the field of the retinal distribution of the fibres. The raphé gives rise to the nasal step and the arching bundles to curved scotomata. The presence of these defects indicates a process affecting the nerve fibres as against the ganglion cells. They have never been described in toxic atrophies. The progressive or stationary nature of the condition may be demonstrated by comparing the fields for colour with those for white; if the colour fields preserve an approximately normal relationship to the white fields the atrophy is stationary or only very slowly progressive, but should the colour fields be relatively much more depressed or contracted then the condition is advancing.

Dr. Traquair then discussed the application of these principles to the following clinical groups, illustrating his remarks by a series of typical perimetric charts shown on the screen: (1) Both discs show simple atrophy, visual failure bilateral; (2) one disc shows simple atrophy, the other being normal, visual failure bilateral; (3) one disc shows simple atrophy, the other being normal, visual failure unilateral; (4) one disc shows simple atrophy, the other papillœdema, visual failure on the side of the simple atrophy or on both sides; (5) both discs show post-neuritic atrophy, or one simple and one post-neuritic, visual failure bilateral; (6) one disc shows post-neuritic atrophy, the other being normal, visual failure unilateral.

Mr. A. F. MACCALLAN (Egypt) said he had recently adopted the following classification of optic atrophy in the Egyptian ophthalmic hospitals: (1) Primary spinal disease and arterio-sclerosis; (2) the result of retro-bulbar neuritis; (3) post-neuritic atrophy; (4) the result of disease of the retina and choroid; (5) after compression or injury of the nerve; (6) unknown causes. In 1921 there were 114 cases of optic atrophy. Of these, 46 were of the post-neuritic type, 19 were cases of primary atrophy; the cause was unknown in 16 cases. Retro-bulbar neuritis accounted for 24 cases; 23 occurred after acute infectious diseases, generally typhus; 11 cases were secondary to forms of retinal disease; and 3 followed compression or injury of the optic nerve.

Mr. PERCIVAL J. HAY (Sheffield) described a case of optic atrophy after acute meningitis in a child aged 18 months. Both fundi were normal soon after the attack, but three months afterwards both optic discs had become quite white.

Dr. L. WEBSTER FOX (Philadelphia) described a new form of optic atrophy due to wood-alcohol. The condition was a very serious one and was now found not infrequently in manufacturing centres in the U.S.A. In 24 to 36 hours a perfectly normal optic nerve may become white as wax. In one case in which this condition existed the nerve was pale, the central arteries had vanished, and there was pallor of the whole fundus. In cases of continued inflammation following injury of the visual centres atrophy develops three months later. The patients were unconscious at first, with hazy vision but normal fundi. Dr. Webster Fox was anxious that pathologists should investigate the differences between these two widely different classes.

Mr. N. BISHOP HARMAN (London) said that in examining 4000 cases of blindness 63 were babies, and of these 7, or 11 per cent., were due to optic atrophy. Among 1885 blind school-children there were 355 cases, or 19·2 per cent., and 65 per cent. of these were due to inherited syphilis. The "all-ages" group included 925 cases, and 270 of these, or 28 per cent., were cases of optic atrophy. Meningitis was the chief cause in babies; congenital syphilis in school-children; and at all ages syphilis and vascular diseases, many of the latter also probably syphilitic in origin.

Mr. J. GRAY CLEGG (Manchester) described some cases of optic atrophy following injury. He had never seen any ill-effects as regards optic atrophy following the administration of salvarsan. He drew attention also to the importance of examining the urine in cases of tobacco amblyopia as some of these cases were glycosuric.

Dr. W. INGLIS POLLOCK (Glasgow) described a case of injury to the skull in which the optic nerve sheath was found full of blood four weeks after the injury. He also referred to the case of a child with double optic atrophy due to a dermoid in the pituitary fossa, in which optic atrophy and possibly some slight X ray enlargement of the sella turcica were the only symptoms.

Dr. J. C. DOUGLAS (New South Wales) thought there was an analogy between the conditions described by Mr. Pringle and the state of "physiological block" referred to by Prof. Harvey Cushing in cases of pituitary tumour. He further suggested the following classification of cases of optic atrophy:—1. Grey, tabetic type: simple. 2. White, post-neuritic type: inflammatory or proliferative. 3. Waxy yellow with small vessels: vascular atrophy.

Dr. J. A. WILSON (Cambuslang) alluded to three cases of head injury. Monocular optic atrophy developed in a few days in one case; in the others after months.

Mr. T. H. BICKERTON (Liverpool) remarked on the frequency of optic atrophy as a result of bicycle accidents and advised that such should not finally settle questions of compensation for at least two years.

Dr. A. J. BALLANTYNE then read a paper by Dr. GAVIN YOUNG (Glasgow) on the

Relation of the Optic Nerve to the Sphenoidal and Posterior Ethmoidal Sinuses.

The sphenoidal sinuses were examined by dissection in 30 post-mortem room subjects. Normally the posterior wall of the posterior ethmoidal cells lies on the antero-lateral aspect of the sphenoidal sinus. The relationship, however, varies according to the amount of bone absorption. In the sclerotic type the posterior ethmoidal cells lie laterally to the sphenoidal sinus. As the cells expand the sphenoidal sinus becomes larger at the expense of the lateral wall, while the ethmoid creeps in towards the middle line. The canal of the optic nerve is in close relation to the postero-lateral angle of the post-nasal sinuses near the roof at the posterior end of the orbit. In the sclerotic type the nerve is related to the posterior ethmoidal cells which lie laterally to the sphenoidal sinus. In the various types the relationship is altered by degrees, until in thin-walled sinuses the canal is in relationship to the sinus posterior to the ethmoidal cells.

Mr. MACCALLAN read a paper on ophthalmic progress in Egypt, in which he reviewed the history of the group of ophthalmic hospitals under his control and the school of ophthalmology that has sprung from them. His paper does not lend itself to abstraction.

Dr. M. A. EL-KATTAN (Cairo) pointed out that in conjunctivitis the causative organism has to be isolated within the first few days of the attack. Reasoning from analogy it would seem to be unprofitable to search for the cause of trachoma except in the very earliest stage of the disease, and experimentally produced trachoma in rabbits and monkeys would seem to hold out the best promise of results.

Dr. WELLWOOD FERGUSON (Glasgow) read a paper detailing the results of examination of the cerebro-spinal fluid in disease of the fundus by the following methods: (1) Wassermann reaction; (2) Ross-Jones test for protein content; (3) Lange colloidal gold reaction; (4) cell-count. He concludes that the colloidal gold reaction indicates the first definite sign of organic disease of the central nervous system and emphasised its value in early diagnosis.

Dr. INGLIS POLLOCK read a paper on the "open" treatment in eye operations in which he advocated a cage dressing after operations such as trephining and cataract extraction combined with voluntary periodical opening of the lids.

THURSDAY, JULY 27TH.

Clinical Significance and Treatment of Heterophoria.

The PRESIDENT, in opening a discussion on this subject, said that in every case of heterophoria the first point is to distinguish between those that are *comitant* and those that are *non-comitant*. Suppose,

with Maddox rods before the right eye and the head in the primary position, a total esophoria of four centrads is shown; if now we turn the patient's head to the right so that he has to assume the "eyes left" position, and a deviation of eight centrads appears, the deviation is non-comitant and there is paresis of the left external rectus. Similarly, on assuming the "eyes right" position, if the deviation be more than four centrads he must have a paresis of the right external rectus. Eso- or exo-phoria is only comitant when the deviation in the "eyes right" and in the "eyes left" position is the same as that in the primary position. Comitant heterophoria is due to some supranuclear lesion; non-comitant heterophoria to some lesion in the muscles, nerves, or terminal motor nuclei. For purposes of diagnosis the 12 muscles of the eye may be divided into 3 groups of 4 each; 4 moving the eyes laterally, 4 upwards, and 4 downwards. Each group is divided into 2 pairs, 1 muscle of each pair being in the right eye and 1 in the left. 1. Lateral: (*a*) Right turners—right external rectus and left internal rectus; (*b*) left turners—left external rectus and right internal rectus. 2. Elevators: (*a*) Eyes right—right superior rectus and left inferior oblique; (*b*) eyes left—left superior rectus and right inferior oblique. 3. Depressors: (*a*) Eyes right—right inferior rectus and left superior oblique; (*b*) eyes left—left inferior rectus and right superior oblique. The names are easily remembered by the mnemonic of Maddox that their names are the most contrary possible—e.g., right external rectus and left internal rectus. If we consider the patient's field to be divided into right superior, external, and inferior areas, and left superior, external, and inferior areas, and find the area in which the greatest cardinal diplopia occurs, the condition must be due to the same named muscle or to the most contrary named muscle. In order to distinguish which eye is affected, cover one and note which image disappears; if the farthest image from the mid-line or horizontal line disappears the covered eye is the paralysed eye, and vice versa. If one eye is defective and the paretic eye fixes, the associate muscles in the other eye will undergo a marked secondary deviation. The screen test, largely used in America, is also of value in rendering a deviation manifest.

The most characteristic symptom is occasional diplopia. Headache, giddiness, and depression are often present and are relieved by an appropriate prismatic correction. One peculiar symptom is the inability to read near type (J1) with both eyes, though each eye separately can read J1 quite easily. It is probably due to vertical diplopia which frequently recurs; as the angle of separation is so small the images of the printed letters overlap when close to the eyes and hence cause great confusion. There is also often a tendency to convergence at a distance, but a tendency to divergence at reading distance. Mr. Percival never corrects any heterophoria, however great it may be, unless it be attended with symptoms. He makes his patients wear a trial prismatic correction for at least half an hour in his waiting-room to judge the effect. He considers that non-comitant hyperphoria is far from uncommon and finds that a paresis of a depressor is more annoying than a paresis of an elevator. In cases of comitant horizontal deviations Mr. Percival accurately corrects the refractive errors, and finds the relative range of convergence. A prismatic correction or decentration is prescribed only if symptoms persist and the area of comfort is contracted.

Dr. WEBSTER FOX said that heterophoria may be regarded as a form of neurasthenia. When compensatory hypertrophy has made the fusion reflex great enough to overcome it easily, the heterophoria may be regarded rather as a harmless anomaly than as a pathological symptom. The trouble begins when compensation fails to be completely obtained. There are many psychic factors that effect fusion. Further, orthophoria will be found with the Maddox rods in a whole group of cases showing varying peculiarities—e.g., the muscle will overcome a stronger prism base down before the right eye than base up before the left, and that nearly always the left eye will overcome a stronger prism base down than base up. Compensation is doubtless effected by a host of factors embracing the whole domain of human physiology and it is never constant or static. In the treatment of heterophoria Maddox advises first discovery of the cause and its removal. Then examination of the refraction and the correction of ametropia. If lateral and vertical deviation exist together, he corrects the vertical and ignores the lateral. Next he prescribes muscle training and prism exercises and, last of all, muscle operation (graduated tenotomies). Sheard reviews the work done in recording the movements of the eye during reading. As pointed out by Javal in 1879, these are discontinuous, and the eyes steady themselves for each completely focussed picture. On this basis Landolt concluded that 1·5 words on the average were read at each fixation. Delabarre and later Huey obtained tracings of the ocular movements, and the latter showed: (1) In reading relatively long lines the average number of fixations is about 4·5 per line; (2) doubling the distance from the eye to the page does not affect the number of fixations; (3) minor changes in size of type do not affect the number of fixations; (4) the duration of the reading pauses, although variable, averages about 0·19 seconds; (5) fast reading entails fewer and shorter pauses but not faster movements; (6) a short line—e.g., about 60 mm.—makes possible fewer pauses relatively, so that more is read with a single pause; (7) the movements from left to right are quite constant at 0·042 to 0·048 seconds; (8) the movement of return is quite constant at 0·051 to 0·058 seconds. Further observations have been made by Erdman and Dodge and by Dearborn using Dodge's latest method. Dearborn states that the duration of the fixation pause is, roughly speaking, 1/5 second. Fixation is only approximate—i.e., the eye often makes slow changes of position during a fixation. Fatigue causes a slower rate of reading and a gradual decrease in the velocity of the eye movements, and Dr. Webster Fox ventures the inquiry whether the multiplicity of the steps and the readjustments is not the cause of the fatigue, not the prolonged accommodative effort. If fixation is so frequent it becomes necessary to measure the so-called muscle balance of every patient at each examination of the refraction, retaining such records for the time when symptoms of muscle asthenopia appear. Ruggeri showed that efforts of extreme convergence were accompanied by an increase in the pulse-rate in patients suffering from multiple neuritis, malaria, diphtheria, and influenza, and it is interesting to note that a large number of heterophoria patients is derived from recent sufferers from these diseases.

The general conclusion was that heterophoria was a constant accompaniment of binocular single vision although not always symptom-producing. It varied considerably in each individual patient and was extremely fluctuating in amount. The factors necessary to cause an existing heterophoria to assume a pathological significance are fatigue and exhaustion in general and fatigue and exhaustion of the eye muscles in particular, especially in the presence of uncorrected ametropia and after debilitating diseases. With regard to treatment rest of the eyes and of the whole body; correction of ametropia; proper centring of the lenses, particularly of bi-focals; correction of the heterophoria as a result of frequent tests of the muscle-balance through correcting lenses both for distance—at 6 metres—and at 30 cm. A long period of atropine cycloplegia is often useful and prism exercises also when patients can be persuaded to persevere with them.

Dr. J. A. WILSON pointed out that movements not muscles were cortically represented. In 100 consecutive cases, 84 per cent. were females aged 15 to 30 years, with low degrees of hypermetropia. Excessive accommodation helps to determine imbalance. Many of his cases were "near" workers and gave a history of recent illness.

Dr. HANFORD (Hong Kong) pointed out that changes in ocular muscle-tone occur after residence in the tropics and that sufferers from heterophoria should be advised to consult an ophthalmic surgeon while residing in the East.

Mr. BISHOP HARMAN drew attention to the wide variation in ocular muscle arrangements in other vertebrates, and considered it not unreasonable to suggest that muscular imbalance in man may have for its basis some variation of muscle arrangement, that, in fact, it was anatomical and not merely functional. In serious cases where prisms were insufficient he advocated the method of subconjunctival reefing.

Mr. GRAY CLEGG estimates the phoria for distant and near vision after correcting the error of refraction. He derives help from nux vomica sometimes and from belladonna, and occasionally gives homatropine to be used at night.

Mr. H. CAIGER (Sheffield) emphasised the mental distress—nervous depression, weariness, indecision—caused by heterophoria.

Dr. T. STEWART BARRIE (Glasgow) read a paper on

Monocular and Binocular Vision.

He said that in observing a landscape at least six attributes of visual sensation can be distinguished: quality and intensity of colour; time and duration from observing moving objects; and extensity and position. These are not in the objects themselves but are psychical deductions. The act of vision is not comparable to a photograph. The formation of an image on the retina is but the first step from which we deduce mentally the three dimensions of height, width, and depth. The perspective of the image gives an indication of depth, but the living eye is never at rest, and many images are formed per second so that vision is largely kinematographic. When one looks with one eye closed at the photograph of a landscape the three dimensions are easily recognised and the scene stands out in moderate relief, an effect intensified by the use of a lens. On looking at a film of the same landscape taken by a kinematographic machine carried directly forwards, depth becomes still more marked. In man a similar result follows the continuous movements of the eyes and the forward movement of the body. Thus there can be appreciation of depth without the extraneous aids of perspective, atmospheric effects of light and shade, &c. Memory also plays an important part. We try to bring our present visual experiences into relationship with those which have gone before. Though in ordinary circumstances there is no diplopia with binocular vision, it can be elicited easily, and actually the only object seen singly is the object directly under observation. Dr. Barrie showed various diagrams which suggest that binocular vision is essentially alternating in character, and he concludes that physiological diplopia is due to the effort to make simultaneous actions actually consecutive. Sherrington's binocular flicker experiments and others which point to "strife of the fields" of vision lead to the same conclusion. He deduces, therefore, that from each eye there is developed a definite sensual image and when these cannot be combined into a single image there is alternation of the two images or actual suppression of one over the area where confusion would normally result. In monocular vision the appreciation of depth is inherent in the sensation of vision and is accentuated by the consecutive stimuli resulting from the formation of retinal images; binocular vision is essentially monocular vision, but simultaneous stimuli from the formation of two retinal images is the rule; though apparently a single sensation, in reality it is alternating monocular vision. The practical importance of this conception of vision is that in ordinary circumstances the man with amblyopia in one eye from infancy is at no disadvantage compared with the man with two normal eyes.

Other papers read were as follows: Education of Partially Blind Children in Myope Classes, by Dr. H. Wright Thomson (Glasgow). Notes on a Case of Migraine with Unusual Symptoms, by Mr. A. R. Moodie (Dundee). The Venereal Disease Clinic of the Glasgow Eye Infirmary, by Dr. E. J. Primrose (Glasgow). Conjunctivitis Artefacta, by Dr. H. Caiger.

SECTION OF RADIOLOGY AND ELECTROLOGY.

WEDNESDAY, JULY 26TH.

Dr. LEONARD A. ROWDEN (Leeds), the President, having opened the session with a few preliminary remarks, Dr. J. R. RIDDELL (Glasgow) opened a discussion on the

X Ray Treatment of Deep-Seated Cancers,

with special reference to Erlangen methods. The essential differences, he said, between the Erlangen method and the older one in X ray therapy lie in the fact that the object in the newer system is to attain homogeneity in the rays used, to administer an equal dose to all the diseased tissues, and to do so at one sitting. The quantity given is predetermined, and it is such that it will destroy the diseased tissues; but not the healthy—they will be damaged to a greater or less degree according to their radiosensibility, but the quantity must be short of that which will destroy them. Homogeneity is attained by using rays of very high penetration and short wave-length, the equivalent to a 16-in. spark gap between blunt points in air, and by filtration. The thickness of the filter depends to some extent on the apparatus used. For a gas tube and coil, 5 mm. of zinc are employed; with a Coolidge tube a greater thickness is necessary.

Much research has been carried out by independent investigators to determine just what dose will destroy diseased cells without causing destruction of healthy tissues. It has been found that healthy tissues are much more resistant to X rays than diseased. The measurement of the dose is regulated by time, which means that the apparatus must be run under standard conditions. Any change in the conditions would naturally alter the output and therefore the time necessary to give a certain quantity. Seitz and Wintz have taken as their unit that quantity of radiation which will produce a slight redness of the skin after a week and leave a slight pigmentation after a month. This is taken as 100 per cent., and on this basis the doses have been determined for the various conditions to be treated.

The rays in passing inwards from the surface lose in volume as the distance from the source increases, also they lose by absorption in the tissues through which they pass. On the other hand, they gain by these secondary radiations which they set up in these tissues. Obviously, this secondary radiation will be greater with a large port of entry than with a small one. It is evident that the estimation of the dose given below the surface is a very complicated one, and it is still further complicated by the fact that each tube has its own percentage deep dose. Radiologists must attempt to visualise the exact site and limits of the disease in order to give every part of it the full dose required—e.g., with a tube giving 20 per cent. of the "unit skin dose" at 10 cm. below the surface it would be necessary to use five ports of entry with the rays, so directed that they intersect at the point aimed at and yet do not give a destructive dose to healthy overlying tissues or organs. (It is here assumed that carcinoma is being treated which requires 90 to 110 per cent. of the unit skin dose.)

When the application is to be made to a part where it is not possible to x-ray from different angles, as, for example, the breast, the equal distribution of the dose is obtained by increasing the target skin distance, thus reducing to a minimum the difference in density between the rays falling on the skin and those reaching the farthest border of the disease. Seitz and Wintz have shown the necessity of giving full doses at one sitting. They say that a dose sufficient to kill a cell if administered at one sitting is insufficient if it be divided over a number of days, as in the intervals the cell has time partially to recover and, it may be, even to develop an immunity.

Statistics were given of the number of cases treated from June, 1921, till June, 1922, and they showed very encouraging results. In a good proportion of cases the symptoms had disappeared completely; but it would be extremely unwise at this early stage to speak of these as cures. The relief of pain and of the more distressing symptoms in some of the other cases would in themselves justify the employment of this method of treatment.

Dr. DOUGLAS WEBSTER (Edinburgh) pointed out that the two advantages of the newer methods were the quantitative basis and the much greater depth intensity now possible. As to the so-called "cancer-dose," observations on cachectic patients and some mouse-tumour experiments suggested that direct radiation *alone* was unable to kill cancer cells; the biological response depended on (1) the amount of absorbed radiation, (2) the tumour cells' radio-sensitiveness, (3) the response of the stroma, or neighbouring tissues, and (4) the reaction of the whole organism. And as to the histologist, there were so many distinct types of tumours that the term "cancer-dose" should be abolished, or only used with qualification as to type meant. Cachectic patients and those with wide-spread lesions—e.g., in both pelvis and abdomen, should not be accepted for treatment unless for restricted local radiation treatment and possibly immunity effects. Technical details were dealt with, and the original Erlangen methods were criticised (1) as regards their theory of the value of preliminary ionisation, and (2) as regards their use of extreme distance-fields; for the latter with great advantage could be substituted the interposition of wax or water-bags whereby the time necessary for the original Erlangen distance doses could be halved or even made shorter with the attainment of equivalent depth-doses. The very small fields were so difficult to orient, and all depth radiation so difficult to calculate, that the making of scaled sectional drawings in each case was recommended as the only way to approach accurate dosage. The position was not clear yet as to the comparative value (1) of the absolutely maximal "cancer-dose" ideal of Kronig and Warnekros, or (2) the smaller dose frequently repeated, used by many, or (3) the Erlangen method of submaximal doses repeated two or three times, which occupies a middle position between (1) and (2). The dangers of deep X radiation, if carried out by untrained or lay persons, was emphasised. The new methods were not considered advisable in all cases, and combinations of shorter and longer wave-lengths were considered better sometimes; especially in breast cases was care needed not to cause blood damage. The newer methods constituted a most important advance in instrumentation, technique, and measurement, and the results in some cases appeared to be better than any other method of treatment could give.

Dr. F. HERNAMAN-JOHNSON (London) proposed to confine his remarks to certain fundamental principles. A cancer could not be clinically considered apart from the tissues amongst which it grows, or from the patient as a whole. The effect upon a tumour varies not only with its histological structure and with its position in the body, but also with the particular moment of attack. In thinking of tumours a dynamic should be substituted for a static conception. No two can be really alike if their growth, mitotic activity, and metabolism be taken into consideration. That the surroundings are of great importance is obvious to anyone who remembers the comparative benignancy of rodent ulcer in the soft parts and its extreme intractability when it invades cartilage or bone. As to the patient, if he be anæmic he will not respond well to radiation, and that rapid metastasis is apt to follow an attack of acute illness, such as influenza, is well known. The factors concerned being so numerous and so variable, he had never found himself able to accept the doctrine of the single lethal dose. He questioned if it were still held by those who proclaimed it. At least they now talked of subsequent "precautionary" doses, thus abandoning the whole principle of the knock-out blow. Carefully graded dosage was therefore able to produce a cumulative beneficial effect. In this country a vast experience had been built up in the treatment of breast carcinoma with apparatus that would now be called feeble—i.e., with tubes run at an eight- or nine-inch equivalent spark gap. This treatment had been the means of relieving an immense amount of suffering, and he hoped that those men attached to small hospitals which could not afford new outfits would continue to use it while doing their best to obtain more powerful apparatus. As clinically used in Great Britain the graded dose never made a breast cancer worse and often caused its disappearance. In fact, patients so treated usually died after some years from distant metastasis, and he doubted if the massive dose and the highly-penetrating ray could avert this result. If used indiscreetly, they could on the other hand easily precipitate it; as, for a time, they lowered the patient's general resistance to cancerous invasion. He himself had installed an apparatus capable of exciting a new model Coolidge tube in oil at 230,000 volts and had used it for a year. The high penetrative quality of the rays obtained was of undoubted value in the treatment of uterine carcinoma and certain other deep-seated tumours, and it might be that massive doses at long intervals were the most effective in this instance; but he wished to emphasise the fact that in breast carcinoma really fine results had been achieved in this country before the Erlangen method was ever heard of. These results were the more remarkable when one remembered that only surgical failures, or surgical impossibilities, came to the radiologist here. On the other hand, the Erlangen reputation was made in the treatment of early operable cases of carcinoma of the cervix. He thought the Erlangen people themselves were very fair in their statements and were not responsible for the overbooming of their method which has occurred in Great Britain. They showed great enterprise in their recent attempts to "sensitise" tumours by the galvanic current previous to irradiation. This represented a step towards "combined treatment," which alone, in its fullest sense, could hope to cope successfully with a disease so protean as cancer.

Dr. SABERTON spoke on the value of unfiltered rays in the treatment of superficial growths, and Dr. W. MITCHELL, Dr. J. GIBSON GRAHAM, Dr. A. R. HALLAM, Dr. W. H. FOWLER, and Dr. HOWARD HUMPHRIS contributed to the discussion.

Dr. J. M. W. MORISON (Manchester) showed a remarkable series of radiograms of rare injuries and other uncommon pathological conditions.

The last paper of the day was one by Dr. HERNAMAN-JOHNSON on the value of

Gas-inflation in X Ray Diagnosis.

He preferred the use of CO_2 and showed some excellent radiograms in support of the usefulness of this method.

Dr. MAGNUS REDDING (London) said that in discussing the value of a method of diagnosis it is necessary to consider: (1) The safety and ease of the method; (2) scope and limitation of usefulness, (3) accuracy of results.

1. The *preparation of the patient* by aperients and starvation must be at least as thorough as for abdominal section. The actual method of injection is simple and easy, no elaborate apparatus being necessary; but strict aseptic technique must be observed. The injection is nearly always painful, and may be very distressing to the patient. It is unnecessary to measure the quantity of gas as this is limited by the patient's tolerance. The needle may be re-inserted after radiography to relieve distension, but it is impossible to withdraw all the gas in this way. The patient should be invariably sent back to bed on a stretcher and should not sit up until he can do so without discomfort. The unavoidable accidents which may occur are: Injury of gut or of omental vessels adherent at site of puncture; the latter accident occurred in one of his cases and resulted in great pain and distress.

2. *Scope of Method.*—Patients of any age are suitable. Recent inflammations of the peritoneum form an absolute contra-indication. Debility and cachexia do not form a contra-indication unless very severe. The method may be recommended: (*a*) To elucidate alterations in size and

shape of liver, spleen, kidneys, ovaries, uterus; (*b*) to demonstrate adhesions, or their absence; (*c*) to demonstrate abdominal tumours, other than those of the alimentary tract; (*d*) gall-stones: He had had no success whatever in these cases, but other operators appeared to have been more fortunate; (*e*) urinary calculi: The method may be useful in those very rare cases where these calculi cannot be shown by ordinary X ray examination.

3. *Accuracy of the Method.*—Far more experience is necessary to assure any real degree of accuracy. He had found the method of most value in cases of abdominal tumour and of adhesion.

Dr. Redding concluded: This procedure should not be carried out as a routine, but should only be recommended in carefully selected cases where simple methods of investigation have failed and where the information obtainable by the method of pneumoperitoneum is likely to prove of real value. Out of the very large number of cases which have been published, those showing a really useful result which could not have been obtained by other means are amazingly few, and this appears to be due to failure in enforcing careful selection. In suitable cases the method provides useful information which cannot be obtained by any means short of laparotomy.

THURSDAY, JULY 27TH.

Dr. F. HOWARD HUMPHRIS (London) opened a discussion on the

Therapeutic Value of High-frequency Currents and Static Electricity.

Dr. E. P. Cumberbatch, who was to have opened on the value of other forms of high-frequency currents, being unavoidably absent, Dr. Humphris outlined the six forms of static electricity in general use and the therapeutic indications for each. The static bath as a constitutional sedative for the healthy, but generally tired-out individual, or to nervous or highly strung patients, especially when accompanied by a low arterial tension, and he put forward the hypothesis how beneficial results might follow even though there be from this particular modality only a surface charge—namely, that the current of high voltage but of minute milliampèrage when flowing continuously over the delicate nerve endings of the skin of the whole body, it may gently stimulate them and produce a sedative effect in the internal economy. The static wave current, Dr. Humphris claimed to be a successful agent in almost every case of non-infective inflammation, either acute or chronic, in that it produces powerful and painless muscular contractions, thereby relieving local congestion. The static induced current, also valuable for its power to contract muscle tissue, is able to exercise this power even in deep-seated organs. Hence good results from the current will be seen in atony, dilatation, or ptosis of the stomach or other parts of the alimentary canal. The static brush discharge, described in 1786 as "the electric fluid coming from a wooden point," is of great service in many disorders; in cases of neurasthenia associated with low blood pressure being a striking example of this method of treatment. Having mentioned some other forms of static electricity Dr. Humphris concluded by saying that static currents are replaceable by no other forms of electricity, and, with a competent knowledge of their uses, therapeutic effects can be obtained from them which appear marvellous to anyone using them for the first time.

Dr. W. F. SOMERVILLE (Glasgow) said that H.F. currents can boast of an equally striking series of achievements as that accomplished by X rays and radium. He pointed out that definite physiological actions are produced in the tissues and functions of the body, and arranged these effects under three headings: (1) The effects of H.F. currents on surface temperatures of the body; (2) their action on tissue metabolism as indicated by qualitative changes in the composition of the urine; and (3) a therapeutic efficacy in diseased conditions.

Dr. Somerville showed that the surface temperature rose anywhere from 1·5° to 17·4° F. These temperatures were registered by surface thermometers. A rise of temperature also takes place during the administration of these currents, a thermometer in the mouth registering a rise of 1·5°. The changes in the urine definitely prove the effect of the current on tissue change. The elimination of uric acid is increased with a diminution of urea, and, where the ratio between is in the abnormal, it more nearly approximates the normal after the patient has undergone treatment. Several typical cases were quoted:—

Dr. A., before treatment: Quantity in 24 hours, 35 oz. Specific gravity: 1025, deposit, "cayenne pepper" of uric acid. Very faint trace of albumin; no sugar. Urea: 2·7 per cent. = 11·8 gr. per oz. = 418 gr. in 24 hours. Uric acid: 0·026 per cent. = 0·113 gr. per oz. = 3·95 gr. in 24 hours. Ratio of uric acid to urea, 1 : 103 (normal ratio, 1 : 33).

Twelve days after treatment was commenced: Quantity in 24 hours, 36 oz. Specific gravity, 1022. No albumin, sugar, or deposit. Urea: 2·7 per cent. = 11·8 gr. per oz. = 424 gr. in 24 hours. Uric acid: 0·075 per cent. = 0·323 gr. per oz. = 11·8 gr. in 24 hours. Ratio of uric acid to urea, 1 : 36.

In all the cases quoted other conditions remained the same—i.e., the improvement in the urine secretion cannot be said to be due to nursing, rest, or any alteration of feeding, patients continuing their avocation as before. Of the cases which, in the long experience of Dr. Somerville, he has dealt with, he has successfully treated numerous neuralgias of the larger and smaller sciatic nerves and those of the intercostal, the branches of the circumflex and musculo-spiral, the posterior scapular, the posterior and smaller occipital, and the trigeminal nerves. Rheumatic pains yield to treatment and insomnia is overcome. Nervous headaches, and with them sometimes alopecia, are lessened; hæmorrhoids, fissure in ano and pruritus ani are relieved if not cured. Skin affections, such as eczema and acne and even psoriasis, are benefited. Choreic movements subside, chilblains disappear. Asthma is often controlled and strumous glands decrease, and ulcers are healed. Incontinence of urine in both young and old is overcome. The pain succeeding fracture is subdued.

The PRESIDENT asked if the static effleuve was useful in X ray burns and what was meant by "an efficient static machine," and how H.F. currents influenced pathological arterial tension. He also asked if some of the effects might not be due to suggestion.

Dr. HUMPHRIS, in reply, said that when he first began experimenting with the diathermy current he used it on a potato, and after passing the current for three-quarters of an hour the temperature was raised to 212° F. He thought it would be difficult to imagine that the potato was amenable to the suggestion that its temperature should be raised. With regard to pathological arterial tension, speaking in general, currents from the static machine raised abnormally low tension, and diathermic currents, applied by means of the auto-condensation couch, lowered blood pressure.

Protection of the Operator.

Dr. H. E. GAMLEN (Newcastle-on-Tyne) demonstrated the Bucky-Potter diaphragm and the lead-glass shield for the 7-inch Coolidge tube. The advantage of the diaphragm is chiefly greater definition, though it is doubtful whether the added clinical value of this definition is commensurate with the disadvantages, chief of which is, apart from expense, the increase of the time of exposure which has to be trebled or quadrupled. Dr. Gamlen then spoke on the lead-glass shield and on the subject of protection generally.

Dr. ROBERT KNOX pleaded for maximum protection, the protection to be as near the tube as possible. He mentioned a combination of oil and lead as being one of the most effectual methods of protection. He also pointed out that damage might be done to the blood by undue exposure to the X rays, even though there be no evidence of dermatitis.

Dr. MORISON emphasised the fact that the X rays flooded the room through the opening of the diaphragm and were reflected down from the ceiling. If, in addition to the protection near the tube, the operator were covered with an apron front and back, he could be considered almost safe.

Diagnosis of Bone Disease.

Dr. C. W. S. SABERTON (Harrogate) made a short communication upon the differential diagnosis of simple and malignant bone disease. He drew attention to a somewhat rare disease known as "osteitis fibrosa" and showed slides illustrating the condition in its early and late stages. The disease is apparently due to some developmental or constitutional peculiarity by which a gradual conversion of the compact bone into fibrous tissue takes place and the affected limb becomes gradually bowed. The patient complains of aching in the limb and the bone is liable to be suddenly fractured from slight injury or strain. Osteitis fibrosa is not to be confused with other diseases which may simulate it, such as osteomalacia, localised cystic disease of bone, &c. In arriving at a diagnosis of bone diseases the clinical history of the case must be considered in conjunction with the radiographic appearances. Slides illustrating osteomalacia, septic and inflammatory conditions of bone, chronic osteitis, osteomyelitis, sarcoma, secondary carcinoma, and cystic disease were shown, and the special features of the lesions pointed out.

X Ray Diagnosis of Active Tubercle.

Dr. JAMES CROCKET (Glasgow) contributed an illuminating paper on the differentiation of active from quiescent tuberculosis of the lung. He said that the utility of the X rays in the diagnosis of pulmonary tuberculosis has been abundantly proved. In the diagnosis of active from quiescent tuberculosis of the lungs by X rays Dr. Crocket mentioned the three stages in the production of the disease: (1) The implantation of the organisms and the development of a tubercle; (2) local necrosis, and the formation of a caseous nodule; (3) the rupture of the encapsulating membrane of the nodule and the production of an ulcerating cavity. The three steps in the process of repair being: (1) Delineation and localisation—the congestion, alveolitis, and lymphocytosis disappear. (2) Fibrosis and calcification. The production of epitheloid cells and the fibroblasts secure ascendancy over the necrotic process. As a result the affected area is walled up and shut off and the caseous matter undergoes dehydration and calcification. (3) Contraction of the affected area and subsequent alteration of the general orientation of the thorax.

Seven things, caused by tuberculosis, may cause shadows on a radiogram of the lungs: (1) Congestion of the blood and lymphatic vessels; (2) alveolitis in the neighbourhood of the affected area; (3) local lymphocytosis; (4) the infiltrated proliferated epithelioid cells; (5) fibroid tissue production; (6) caseation; (7) calcification.

The indications of the activity of the disease are congestion, alveolitis, lymphocytosis, and epithelioid cell production. These produce, if anything, faint cotton-wool ball-like shadows. Shadows resembling the cirrhose clouding that one sees in the sky on a summer day. The shadows caused by fibrosis, infiltration, caseation, and calcification are dusk and dark. In chronic fibro-caseous tuberculosis, where the shadow is dark and there is little woolliness or mottling, it is impossible in most instances to tell from a single radiogram whether or not the disease is active or quiescent. Serial radiograms are very useful and very suggestive. Patients suffering from chronic tuberculosis of the lungs should be radiographed periodically, just as patients suffering from cardiac disorders have pulse and heart tracings made and filed for reference and comparison.

It is very interesting, he said, to trace radiographically the development of tuberculosis as it is advancing: 1. There is diffuse haziness of the affected area and enlarged trunks radiating from the hilum. This haziness is best made out by radioscopy, using a low milliampèrage and a small diaphragm. It may not come out at all on a radiogram. 2. The trunks become more accentuated and buddings, rounded or oval in form and appear on certain branches, particularly the upper branches. These buds are better seen by radiography than radioscopy. 3. The buds become more numerous, become larger, and become more dense in the centre. 4. The buds coalesce and become cloudlike, particularly marked towards the hilum. 5. The shadows become more dense. Diffuse mottling is usually seen peripherally. 6. The whole lung may become dark, except for rounded clear areas significant of cavity formation.

In a case of retrogressing disease one finds: 1. Disappearance of the mottling and haziness generally. There may persist a fair amount of haziness due to thickened pluræ. 2. Development of greater density. The edges of the areas become sharply cut. This is due to the emphysema. 3. Retraction of the dull areas. They become smaller and ultimately less opaque. 4. Widening of the interspaces and free movement of the ribs and diaphragm.

In conclusion, Dr. Crocket said radiology should be used simply to amplify. It can never supersede clinical methods in the diagnosis of phthisis and in determining its activity.

X Rays in Skin Disease.

Dr. E. W. REED (Manchester) stated the case for X rays in diseases of the skin and argued the case for X rays against ointment. He said that in all the text-books on skin diseases lotions and ointments are eulogised, whereas the treatment of dermatology by X rays is mentioned last as though it were of less importance, and in many cases such dermatoses as psoriasis, in which X rays have an almost specific action, their use is hardly mentioned. Dr. Reed pointed out the disadvantages of using X rays when there was any suggestion that metal of any kind had been used in previous treatment. Dr. Reed explained a refinement of technique which he had found very useful in treatment, and this was the alteration of the thicknesses of the filters in each treatment—i.e., begin with no filter at all for the first exposure of the rays and gradually increase the thickness and density of the filter to a maximum, and then, reversing the process, returning little by little to the starting point of no filter. In all forms of skin disease treated by X rays the treatment should be suspended immediately at the first sign of X ray reaction. Dermatological indications for X ray treatment are: (1) Induration, especially acne indurator—indeed, all forms of acne improve—keloid and tuberculous glands; (2) pruritus—Dr. Reed said that almost all cases of itching are relieved with four three-quarter Sabouraud doses; (3) chronic infiltrations; (4) lichenification; (5) epilation; and (6) new growths.

Dr. J. GIBSON GRAHAM (Glasgow) read a paper on the X Ray Treatment of Tinea Tonsurans, in which he said that this treatment is one of the triumphs of X ray therapy. An experience of 12 years, in which he had treated hundreds of cases, led him to state emphatically that it was safe, expeditious, and satisfactory. Dr. Graham said that Adamson's method was the one he had followed, in which the scalp is irradiated from five centres, using a hard tube. The irradiation occupies on the average eight minutes for each centre, the result being in the great majority of cases complete baldness in three weeks to a month, followed by a regrowth of the whole of the hair in two months more. Untoward sequelæ he had found occurring occasionally in scalps which had been subjected to irritating ointments, especially those containing mercury. These sequelæ show themselves principally in the form of pustulation, subcutaneous abscess, and indurations, or crusting and matting together of the hairs which, when removed, show a moist, weeping, inflammatory surface below. Occasionally cases have occurred in which a certain dryness and scaliness of the scalp have resulted. But in all the cases the result has been ultimately satisfactory. Dr. Graham said he had also met, in his own practice, one or two cases of limited permanent alopecia—i.e., a patch about the size of a shilling to a five-shilling piece. He said he had never seen a case which showed that the X ray treatment had had any ill-effect on the brain.

THE LANCET.

LONDON: SATURDAY, SEPT. 23, 1922.

Cancer.

THE letter from Mr. JOSEPH E. ADAMS, which appeared last week in our correspondence columns, opens up a question of great importance. He advocates the initiation of an active anti-cancer propaganda, the object of which would be to educate the public at large in the early signs of malignant disease so as to induce them to consult their medical attendant as soon as the disease or a suspicion of it has become apparent to them. In this way our correspondent hopes to control cancer. The proposal merits careful consideration, but before we begin it would be well to count the cost and to reflect on what we are likely to gain by it. Certain public health departments in this country have already taken some action, and as an illustration of this we print on p. 686 the text of a leaflet which has been widely circulated in Leicester with the aid of the health visitors. From what we can learn of experience in America, propaganda, in order to have any effect at all, has to be continuous, and continuous propaganda is expensive. If successful it will have as its result a reduction in the number of inoperable cases of cancer in those sites which are capable of accurate diagnosis. On the other hand, such a propaganda cannot diminish the incidence of cancer; it cannot even limit the number of inoperable cases of cancer of the internal organs where diagnosis is difficult and often missed. And he would be a bold man who would undertake the responsibility of guaranteeing a sensibly diminished cancer mortality as the result of a crusade of this nature against cancer. The most we can reasonably hope for is that in a certain number of cases, which might otherwise have delayed medical consultation, life will be prolonged for a few years. This, no doubt, is in itself a result well worthy of effort. Surgeons of the calibre of the late Sir CHARLES RYALL have devoted their lives to it. But we should not raise false hopes among the public by suggesting that such an effort is in any way likely to control or even to combat cancer.

Advocates of such a propaganda draw analogies with the successful campaigns against syphilis and tuberculosis. But these analogies are misleading. In syphilis and tuberculosis we know the cause to be specific bacteria, we know the mode of infection, we have reliable diagnostic methods which will indicate the presence of the disease in its earliest stage, we have specific treatments which, tedious though they are, give a reasonable hope of arresting or even curing the disease. The plan of campaign here is therefore clearly prescribed: it is to control and prevent infection. But the problem of cancer is far more complex. Though we do not know how it arises, all the scientific work of the last few years tends to prove that it arises de novo and not by transmission from man to man. We cannot, therefore, hope to control cancer by preventing exposure to infection as we can in the case of syphilis or tuberculosis. There is no specific cause or mode of origin; the more we learn from the recent experimental work the clearer it becomes that the agencies which contribute to the causation of cancer are manifold and various, and that they must be operative for a considerable number of years. Clinical and biochemical work points in the same direction, as Sir GEORGE BEATSON makes clear from his work at the Glasgow Cancer Hospital, where attention has been directed to the part played by fat pigment in the mechanism of cell proliferation. We have at present no means of diagnosing the onset of cancer. The disease can only be detected after it has been present for a considerable time and we cannot even tell at what particular point of time the disease began. Surgical treatment involves a disfiguring or crippling operation with no certain promise of either permanently arresting or curing the disease. The preventive surgery recommended by Mr. ADAMS, if carried to its logical conclusion, brings us to the proposal, which a German surgeon made some years ago, that all women should have the uterus removed after the menopause. A heroic measure of this kind would, no doubt, sensibly reduce the incidence and mortality of cancer, but it does not recommend itself to the common sense of the public. The recent startling development in methods of radiation raises just hopes of attaining the ends of surgery by other means but has no bearing on prevention.

The only effective way of controlling cancer lies in increasing our knowledge of the disease. To produce a disease experimentally at will is always the first objective in its conquest. That objective has now been reached thanks to the work to which we have alluded. If we can identify the agencies which by continued action lead to the development of cancer we can begin to build up a rational prophylaxis. This work requires material support, and the Federation of Medical and Allied Societies is proposing to use its influence in urging upon the Government the necessity of allocating half a million pounds to the prosecution of cancer research. Thus it can only be a question of time until the active cancer-producing constituent of tar is identified and tar-workers are protected against its action. Other forms of malignant disease, such as cancer of the breast, are likely to be due to agencies which, we may reasonably hope, will be recognised and identified by patient clinical observations on man, a field of cancer research which has been lying fallow too long. It is encouraging to note that at the Inter-Allied Congress on Cancer to be held at Strasbourg next spring, alongside two obvious subjects for discussion—namely, the experimental production of cancer and the treatment of mammary cancer by irradiation—there is a third and more fundamental item on the agenda—namely, the spontaneous and provoked reactions of the organism against cancer. In one or other of these investigations, pursued with tireless zeal by well-equipped and open-minded workers, we may hope for light on the path to be trod.

Pilgrims and Cholera.

LAST week we summarised carefully the annual report of the Sanitary Commissioner with the Government of India. Recent developments in the political world have not strengthened his hands. Sanitation is now a matter of local government, and while in a country like India certain phases of health work must be decentralised, others, such as the administration of shipping and of the health of ports, and the sanitation of transport to religious festivals, would be better for being kept under central control. The Commissioner states that certain critics of last year's report wonder why it is that malaria is still so rife in India; such criticism implies a curious ignorance of the

vastness of the problem involved. To render even a small town in the tropics free from malaria requires a heavy initial and a considerable recurring expenditure. It is manifestly impossible at the present time to do this throughout the whole country. On one point in this report, however, we should like to lay emphasis in the hope of strengthening the Commissioner's hand in a matter of vital importance. Under the heading of cholera he remarks, "How many times in these reports on cholera has the sinister influence of the great religious fairs and festivals been insisted on." Here we have a matter which it is not beyond the financial or administrative ability of the Government of India to rectify.

Scattered over India are a large number of places of pilgrimage, the best known of which is Juggernath or Puri. To these come thousands, occasionally even millions, of devout worshippers at certain seasons of the year. In the old days, when a pilgrimage was not undertaken so lightly as it is to-day, every pilgrim had to march by road some hundreds of miles to the destination of his choice. Should the devotee be infected with cholera at the pilgrim centre he usually died or recovered from his attack either at the place itself or within the first six or seven marches on the return journey. Hence disease was confined to a small area. The coming of the railroad has changed the whole picture. Persons from remote villages in half the provinces of India arrive home before they sicken and each case becomes a centre from which the malady may spread. Pilgrim centres have spread cholera in India from the earliest times, but the railways have proved highly efficient disseminators of disease. Often enough, of course, all may pass off well. The Magh Mela, held at Allahabad in January of last year, was visited by 1,500,000 pilgrims on the chief bathing day. The medical and sanitary arrangements were supervised by an assistant director of public health and only a solitary case of measles was reported.[1] While all this is common knowledge, yet the authorities have not seriously grappled with the problem. In 1920, the date of the report, Juggernath had not a protected water-supply, although Sir LEONARD ROGERS recommended this 20 years ago, and every visiting sanitarian since has urged its importance. The same applies to many other centres. In the years 1913–15 a special committee was appointed by the Government of India to visit all the important pilgrim centres and make recommendations for their improvement. The committee's report brought to light the extraordinary fact that an important pilgrim centre might be in charge of a pleader or lawyer who, as chairman of the municipality, had absolute power to disregard the advice of sanitary officers in the province if he chose to do so. It was also shown that a number of places of pilgrimage were municipalities with an income of a few hundred pounds a year. Manifestly it is unfair for such small communities to be asked to provide funds for the high standard of sanitary excellence required for the visit twice a year of 200,000–500,000 pilgrims, and local governments are apt to contend that they cannot from their slender revenues allot large sums to comparatively unimportant places.

The fact, however, remains that funds are urgently needed in India for these long-delayed sanitary reforms. The Government of India is prone to assume that its difficulties in health matters have no parallel elsewhere. But it happens to be true that the United States of America have very similar administrative difficulties as regards the inter-State control of infectious disease. The Federal Government has a special department whose business it is to inquire into such matters, and important work has recently been published describing the arrangements made for the protection of travellers on railways. This work has a certain if limited application to the pilgrim traffic in India. In view of the habits and customs of pilgrims it may not be possible entirely to eradicate disease, but we should like to see every conceivable measure taken for the protection of the pilgrims themselves and coincidently for the rest of India.

[1] Fifty-fourth Annual Report of the Director of Public Health, United Provinces of Agra and Oudh.

The Lessons of War Surgery.

THOUGH so few years have passed, we are able to envisage, in something approaching its true perspective, the influence which experience, gained in the great world conflict, has had upon surgical thought and practice. That progress was made, it would be foolish to deny; but considering the enormous opportunities for the study of wounds in every part of the body it is nothing short of amazing that the armistice left us with so little added to our real knowledge of traumatic surgery. The general psychological unrest was unfavourable to quiet meditation and research, and the crying urgency for the solution of many problems, appealing so intensely to numerous potential investigators, found only a very small minority endowed with the necessary power of detachment and opportunity for response. Added to which the tremendous increase in surgical work to be done was more than sufficient to absorb the energies of the whole surgical population. That the European contribution to surgery during the war was less than the output of a corresponding period of peace, the perusal of the Official History of the War[1] will most certainly convince the reader. Naturally our knowledge of the form of projectiles and the results of their action became very precise, as is set out in Colonel E. M. PILCHER'S illuminating article. What else war experience did was to establish the falsity or truth of many of our beliefs about certain surgical procedures and pathological processes; through the very abundance of material it was made possible to select the best of several recognised methods, and to develop and refine the technique of operations but seldom previously performed, such as the transfusion of blood and the treatment of injuries to the lung and thoracic cavity.

Amongst the most satisfying articles in the volume are those by Lieut.-Colonel E. M. COWELL and Captain J. FRASER, dealing with shock. They are probably the best résumé of our knowledge of this subject in the English language, and are accompanied by a good list of original papers for reference. The differentiation of primary from secondary shock, the determination of the part played by tissue destruction and by bacteria, the testing of the theories of YANDELL HENDERSON and of CRILE, the establishment of the effective methods of prevention and treatment, the elimination of futile measures of restoration, all this has been done and surgery emerges from the war enriched, at least, in its knowledge of shock. The abundant need for blood transfusion, dealt with adequately by Major G. GORDON-TAYLOR and Captain K. M. WALKER, and the many opportunities for its practice enabled this procedure to be placed upon a firm practical foundation, so that now it is almost an everyday occurrence in any large hospital. Study of the sections on the General Treatment of Wounds,

[1] The Official History of the War Medical Services. Surgery of the War. Vol. I. Edited by Major-General Sir W. G. Macpherson, K.C.M.G., C.B., LL.D., Major-General Sir A. A. Bowlby, K.C.B., K.C.M.G., K.C.V.O., Major-General Sir Cuthbert Wallace, K.C.M.G., C.B., and Colonel Sir Crisp English, K.C.M.G. London: H.M. Stationery Office. Pp. 618. £1 5s.

ably presented by Major-General Sir GEORGE MAKINS and Colonel C. J. BOND, leaves the reader with rather a feeling of depression that so little has emerged of the worth that will outlive time. As far as can be ascertained, in one laboratory only, that of Sir ALMROTH WRIGHT, was any real attempt made to investigate the natural history of septic wounds and the intimate mechanism of their healing. As a result, we have gained knowledge of the rôle of the blood fluids and cells in the normal healing process, and we are less in the dark as to which natural phenomena we should foster and encourage. Of the part played by the fixed tissue cells and by the various organs of the body we have learnt next to nothing from the millions of wounds which passed under review. The one outstanding achievement was the demonstration that a wound may be sterilised sufficiently to allow of secondary suture with impunity. This result can be arrived at, it is interesting to observe, by more than one method of assisting the natural defence processes. WRIGHT'S physiological methods, the technique of CARREL, and the Bipp method of RUTHERFORD MORISON were in different degrees found effective for this purpose. Yet so little control of septic wounds was really gained that the best of all measures proved to be the excision of every particle of traumatised tissue, a procedure often impracticable in the neighbourhood of vital or important structures. War experience strikingly emphasised the teaching of HILTON, whose professional life was spent in more peaceful time: it was in danger of being forgotten by the present-day surgeon that absolute rest is vital in the treatment of any inflamed tissue. The mortality from fractured femurs was inconceivably greater before an effective routine method of immobilisation was instituted. The reiterated teaching over many years of Sir ROBERT JONES was more than vindicated when the Thomas splint was widely issued.

In the field of anæsthesia the surprise was the small part played by intraspinal methods. Gas-and-oxygen was established as the safest and least noxious of all anæsthetics in suitable cases, but the necessity for its skilled administration became manifest. Ether warmed or administered by a closed method emerged as the best of all routine anæsthetics. Our knowledge of the prophylaxis of tetanus was made very exact, and some advance occurred in the treatment of the disease. No therapeutic agent other than anti-tetanic serum survived the mass experiment of the war. The younger generation of surgeons was confronted for the first time with gas gangrene—of which Major-General Sir CUTHBERT WALLACE writes an account—the knowledge of which had been almost forgotten by the oldest practitioner. Good work was done on the pathology of this disease, but a promising attempt to make a serum was cut short by the cessation of hostilities. We do not find mentioned the work of E. H. KETTLE, which indicates that muscle is in no way peculiarly susceptible to anaerobic infection, its involvement being due rather to accidental circumstances. It cannot be said that we have learned much more of the pathology of trench foot than was known in the days of the Crimean War, but some progress was made in the prophylaxis of the condition. The remainder of the volume deals with the treatment of wounds of the chest, abdomen, urinary organs, and diaphragm. With the exception of the admirable articles on chest surgery by Colonel T. R. ELLIOTT and Colonel G. E. GASK, there is little of permanent interest. If abdominal surgery was advanced little by war experience real knowledge accrued from the bold attempt of PIERRE DUVAL to deal with injuries of the lung. Having proved that the mediastinum of man was more or less rigid, in contrast with the experimental findings in the dog, the field of thoracic surgery was opened to many operators. Cumbrous differential pressure apparatus of all kinds has been abolished, and the surgeon can now open widely one side of the thorax almost with the same safety with which he exposes the abdominal viscera. After this discovery the technique of thoracic surgery advanced rapidly and may now be regarded as firmly established.

The conditions which will prevail in any wars still to come are so problematical that it would be rash to predict that the administrative lessons, so recently gained, will be of use. In an excellent résumé which we print on p. 694 Colonel A. B. SOLTAU points the lesson of minor war ailments. What was acquired in all branches is set forth in this official history, and no doubt the knowledge will form the future basis of organisation.

PROVISION FOR THE SUBNORMAL EX-SERVICE MAN.

ONE of the saddest features of the economy campaign is that the time, thought, and care spent upon the recovery of a large group of war-cripples, using the term in its widest sense, may prove to have been thrown away for want of the modest assistance required to equip them when recovered for everyday life. At institutions, such as Enham for the neurasthenic and Barrowmore for the tuberculous, medical skill and expert training under supervision have brought the ex-Service inmates to a stage at which they can spend normal lives of constant but unlaborious work. Here, under a minimum amount of advice and control, they can continue to live with their wives and families. Should these men be allowed to go back to competitive work under ordinary industrial conditions, nothing is more certain than that they will fail to meet the responsibility put upon them. In the case of Barrowmore Tuberculosis Colony, to the circumstances of which we have briefly alluded,[1] the Ministry of Health itself two years ago urged the rapid provision of 210 beds, and whereas as yet only 60 have been provided, the whole administrative block has been planned out on the larger scale. Closure has now been applied to the bigger scheme, but we are glad to learn that the joint Red Cross and St. John Committee will, in spite of financial stress, make a push to complete the scheme on the smaller scale by providing permanent settlement for some of the men. Most of the inherent difficulties have already been solved. Suitable employment has been devised. There is a flourishing poultry-farm containing 600 or more laying birds, pig-keeping has proved profitable, and a cobbler's shop takes in local repairs and could do more. A carpenter's shop employs about 14 men in all forms of woodwork. Each trade is treated as a separate financial concern, and is planned to run at a profit. It would be a bitter disappointment to all concerned should this village settlement, which is for the subnormal man the happy mean between a sanatorium and home life, be discontinued. Similarly, Enham Village Centre is developing a scheme of rural industries whereby men so seriously disabled as to be unemployable under ordinary conditions can achieve a measure of self-support and independence. There is a risk that this permanent settlement may founder for lack of funds. Our advice for this and similar endeavours would be to regard the present time as the trough of industrial depression and to carry on until adequate support again flows in. Once given up, nothing is ever likely to take their place.

[1] THE LANCET, Sept. 2nd, p. 543.

JOINT COMMITTEE FOR THE STANDARDISATION OF SCIENTIFIC GLASSWARE.—A committee has been formed for the purpose of standardising scientific glassware. The committee is, as far as possible, representative of all the interests concerned—viz., the users, manufacturers, and the institutions and Government departments connected with the glass industry, or engaged in research work or the testing of glassware. Three subcommittees have been formed and a programme of work has been drawn out. When the programme has been carried out, or possibly as portions of the work are completed, the results will be published. Sir Herbert Jackson is acting temporarily as chairman of the committee, and Mr. V. Stott, of the National Physical Laboratory, is acting secretary.

Annotations.

"Ne quid nimis."

PRUSSIC ACID AS VERMIN KILLER.

THE reported death of two men on the *Mauretania* during the process of disinfection has called public attention to the danger of prussic acid fumigation to human life. In order to avoid the risk of importation of typhus at American ports the U.S. Government recently stiffened the requirements in regard to ship disinfection and prescribed the use of hydrocyanic gas. The use of this very poisonous gas for disinfection is not new. The method seems to have been first used in America to destroy the insect parasites of fruit trees, each tree being enclosed in a tent within which the acid was set free. Surgeon R. H. Creel, of the U.S. Public Health Service, applied it in the disinfection of ships at New Orleans seven or eight years ago. He disinfected 180 ships with but one death, that of a stowaway. He claimed many advantages for cyanide over other gaseous disinfectants. Its preparation from dilute sulphuric acid and pulverised cyanide of sodium or potassium is simple and cheap. Its high rate of diffusion shortens the period of disinfection, while the characteristic smell would, he thought, prevent accident. Mosquitoes and fleas were found to succumb rapidly, whereas bugs, rats, and cockroaches required longer exposure, and lice were the most expensive to eliminate. But even for these an exposure of two hours sufficed. The French army, stationed at Mayence after the armistice, advised by its bacteriologist, Mr. Laporte, found prussic acid fumigation an effective way of dealing with parasites of plants, weevils, and beetles in flour mills, lice, fleas, bed-bugs, moths, mosquitoes, rats, and mice. Care was found necessary in regard to foodstuffs, some of which possess the property of absorbing the gas. This does not, however, apply to flour. Prussic acid fumigation was employed by Germany in the war for killing rats and insects in submarines and small merchant ships; in view of its danger the German Government refused permission to private persons to use this method and carried it out through a company which practically owned a monopoly. The Italian sanitary authorities fumigated some 250 ships in 1920–21, to destroy pests of all kinds. In Rome it was found that although woollen stuffs retained a considerable quantity of the acid, it could easily be removed by subsequent ventilation or rise of temperature. Substances containing glucose—e.g., marmalade, syrup, or honey, were, however, found to retain a small amount of acid on their surfaces. In South Africa prussic acid fumigation had long been commonly used for destruction of bugs, and in the years preceding 1913 an appreciable number of fatalities were reported in the reef towns from its use. On the initiative of Dr. Charles Porter, the South African Government introduced regulations in January, 1916, for the licensing of disinfectors. It was made compulsory to give notice of intention to disinfect 24 hours in advance to the medical officer of health, to the occupier of the premises, and to the occupants of any adjoining house, a series of additional precautions being added.

Granted that prussic acid in the form of vapour is second to none either as a raticide or insecticide—though its powers as a germicide appear to be limited—it has the serious drawback for ship fumigation of being invisible and practically odourless in quantities which, though small, rapidly produce unconsciousness and death in individuals accidentally exposed to the fumes. Even though every member of the ship's crew be accounted for by taking a roll-call before disinfection is commenced, there yet remains the risk of chance exposure of stevedore or stowaway. Further, granting the procedure of fumigation, ventilation, and inspection has been carried out followed by the issue of a medical certificate of "all clear," the danger is by no means ended, in view of the many articles able to absorb hydrocyanic acid gas and to liberate it again when a rise of temperature occurs. A full reference to experimental tests made in France is contained in the current issue of the *Revue d'Hygiène*, and we would call particular attention to the record[1] by Dr. N. B. Lehmann, of 47 fatal cases, all occurring in the space of 30 months. On the other hand, port sanitary authorities know that sulphur dioxide gas, not necessarily prolonged over a period of 24–48 hours, is an effective disinfecting agent, and that neither metal work nor coloured fabrics are spoilt when ordinary precautions are taken. We may recall the classical experiments of the late Mr. John Wade, D.Sc., of Guy's Hospital, in his report (1906) to the Local Government Board; the work on marine hygiene and sanitation, by Dr. G. E. Brooke, and recent annual reports of the M.O.H. for Greenock. No one is likely to be deceived and entrapped by lurking fumes of SO_2, which have the outstanding advantage of being as disagreeable and as repellent as they are pungent. We understand that Dr. R. J. Reece and Dr. P. G. Stock, of the Ministry of Health, are paying a visit of inspection to the arrangements for ship disinfection in New York, when no doubt the whole evidence will be carefully weighed.

ERRORS IN FIRST AID.

ONE of the best ways of learning a craft is critically to observe the errors of those who practise it. Dr. N. Corbet Fletcher's little book[2] of 60-odd pages gives a clearer insight into the methods and difficulties of emergency treatment by laymen than the official handbook of first aid itself. He has acquired quite an uncanny knowledge of the besetting failings of the "first-aider." Many of them, he finds, rattle off stock phrases such as "I would be resourceful," "I would treat shock," "I would remove cause," instead of setting out in their own words in what way they would give evidence of resourcefulness when the need arises. He emphasises once and again the prime object of all first aid, which is the prevention of aggravation in any injury or condition which may be encountered in civil life. First-aiders need to bear in mind also their duty towards themselves as well as towards the patient and the bystanders. An ambulance man is of more service if he arrives *after* not before the bomb drops. Dr. Fletcher deprecates the growing habit of slitting up coats and trousers instead of skilfully removing the clothes by ordinary methods, a habit which is earning these drastic aiders the title of "tailors'-touts." Faced with a fracture he warns even the highly trained first-aider that extension requires expert knowledge far beyond his skill. A broken pelvis may not be a very frequent injury, but when present attention is called to the side trouser-pocket as precisely the indication for the upper and lower edges of the bandage applied to control it. A useful warning is given against undue reliance upon the smell of alcohol as a positive clue in diagnosis, for even in acute alcoholism odour may be absent from the breath when respiration is shallow, and brandy has still a tremendous reputation among bystanders for any kind of accident or seizure. The application of oils and oily dressings to burns is baldly stated as "no longer permitted," otherwise first-aiders will by their labours simply increase the existent danger from sepsis. To remove a foreign body from the eye, the patient's own handkerchief moistened with his own saliva is the implement of choice; this will save the first-aider's laundry bill and not mix his own bacterial flora with that of his patient. It is properly recognised that a wise man will allow no one other than a doctor to syringe or to probe his ear, whatever may be the offer of assistance. Tincture of iodine is regarded as the safe and excellent disinfectant of wounds; nevertheless, the less wounds are fingered, the better for them. The tourniquet as a profound source of mistakes comes in for much

[1] Bulletin de l'Office International d'Hygiène Publique, December, 1920.

[2] Common Errors in First Aid (Errors in First Aid Detailed and Explained). By N. Corbet Fletcher, M.B., B.Ch. Camb. London: Bale, Sons and Danielsson, Ltd. 1s.

attention; its use only as a last resource might have been underlined and underlined again. For bleeding from the stomach, Dr. Fletcher rightly counsels precaution carried even to excess, and commends the first-aider who mistook for blood a mixture of stale beer and chocolate and accordingly treated the patient for hæmatemesis. He lays emphasis on the labour required to carry out artificial respiration with success. Silvester's method, even though it is expected and often, indeed, demanded by a London crowd, is so heavy and strenuous a task as to exhaust the first-aider within a very few minutes. Schafer's method can be started without a second's delay and is comparatively easy. We predict for this little book the fulfilment of what the author hopes for it—namely, the same degree of usefulness and popularity as his other works on first aid.

CRANIAL NERVE PALSIES DUE TO EXTRA-CRANIAL TUMOURS.

As a general rule widespread involvement of the cranial nerves indicates a lesion within the cranium and situated at the base of the brain. W. O. Ott reports[1] a series of three cases from the Mayo clinic, where such a wide involvement was due to extra-cranial tumours. In these cases there was unilateral paralysis of the larynx with the involvement of the last four cranial nerves, in two cases due to a tumour arising from the deep portion of the parotid gland and in one case to a lesion in the region of the jugular foramen, the exact nature of which was not known. A full history is given with each case, and all were operated upon with considerable improvement. It is often difficult in dealing with these tumours to make a diagnosis. Ott points out that the condition was first described by Hughlings Jackson in 1864, and after him unilateral associated laryngeal paralysis with paralysis of the soft palate and tongue on the same side has been called Jackson's syndrome. Since then there have been reported numerous combinations of unilateral paralysis of the larynx associated with paralysis of one or more of the last four cranial nerves. The technique of operation which Ott advocates consists of an incision along the anterior border of the sterno-mastoid muscle, extending well up along the front of the mastoid process. By the retraction of the muscle backwards and dissection forwards the tumour can be exposed posterior and medial to the ascending ramus of the jaw. The mastoid process is cut away together with part of the temporal bone below the auditory canal. The bellies of the stylo-hyoid muscle and of the digastric muscle are divided, when by careful dissection the tumour can be removed.

THERMOMETRIC SCALES.

THE anniversary of the death of the German glass-blower, Gabriel Daniel Fahrenheit—he died in Amsterdam on Sept. 16th, 1736—reminds us that he had the remarkable intuition of using the temperature of the human body as the standard for a thermometric scale. He was also short-sighted enough to suppose that a mixture of ice and salt which he prepared was the coldest thing in creation, and having made this his zero he then counted the body temperature as 12 and, working upwards and downwards he noted the freezing-point of water to be 8 and its boiling-point 53. He next multiplied each of these figures by four in order to lengthen out his scale, and even now the German glass-blower's inspired miscalculations form the basis of our clinical, sick-room, and even greenhouse thermometers. Fahrenheit spent most of his life in England and was elected a Fellow of the Royal Society, and maybe for that reason and because of a few years' precedence in time his scale maintains the field in this country and America. It was in 1724 that he published his suggestion; 15 years later, in 1739, the French scientist, René de Réaumur, made known a thermometric scale using, not the human body, but the common physical properties of water as a basis. Taking the freezing-point as his zero, he graduated the stem into degrees each corresponding to one-thousandth part of the volume of the alcohol contained in the bulb. It chanced that the boiling-point worked out at the convenient figure of 80 degrees, and to this day sick persons throughout the eastern half of Europe measure their body temperature on this scale. Three years later, in 1742, the astronomer, Anders Celsius, of Upsala, set out before the Swedish Academy of Sciences the simple and practical plan of dividing the interval between the freezing- and boiling-point of water into 100 degrees. The convenience of the decimal method captured central Europe and gradually spread to scientific work elsewhere. The most fitting way of celebrating Fahrenheit's achievement would be to honour his remarkable idea of measuring the temperature of the human body and to forget his naïve deductions. The formulæ for transmuting Fahrenheit and Réaumur degrees into Celsius may have had some value in promoting mental agility but, like the propositions of Euclid, they should not burden any longer the life of the scientific student.

MALARIA IN THE VOLGA VALLEY.

THE existence of subtertian, so-called tropical, malaria in the lower Volga valley has been known for many years, but it was only shortly before the war (1913–1914) that a commission was appointed to study the question of malaria in Russia and the Caucasus. Malaria probably exists in most parts of Central Russia, wherever the local conditions are suitable to its spread; it even occurs in Archangel during the hot summer months, and several authentic cases were discovered amongst the British troops occupying that region in 1918 and 1919. In the central and northern parts of Russia the benign tertian form occurs, but only in the south can the subtertian or tropical parasite exist. A wave of subtertian malaria (which alone can cause rapid death), spreading in epidemic form, is a common event wherever that disease occurs. There appears to be a rise of incidence yearly during the autumn months, usually September and early October in southern Europe, North Africa, and Asia. Epidemics of this kind have been recorded with accuracy in the Balkans and Palestine; it is known, also, that in certain years a similar spread of the disease occurs in the Punjab (India) after the rains. The probability is that the term "epidemic" is not strictly applicable to these rises in the general malaria incidence. The spread of this disease is due to several atmospheric and geographical factors which must all coincide and combine so as to produce the most favourable conditions. Moreover, the autumn brood of anopheline mosquitoes has just made its appearance, and the insects are more numerous in the early autumn months than at any other time of the year. Add to this economic conditions such as are reigning in South Russia to-day which render the population more susceptibile to infections of all kinds, and it is no matter of surprise that the spread of a malarial epidemic in the Volga valley is reported by the American Relief Administration. The outbreak is particularly severe in Saratov and Samara, whence Dr. F. E. Foucar reports that from 20 to 40 per cent. of the population are more or less affected. Large quantities of quinine are available and steps are being taken to cope with the epidemic.

LOCAL BLASTOMYCOSIS.

ALTHOUGH blastomycotic dermatitis is a comparatively common disease, many cases having been reported since it was first described in 1894, cases of blastomycosis localised elsewhere than in the skin have very rarely been noted, and hence a report by M. Haase, E. R. Hall, and C. H. Marshall[1] of an extremely rare phase of this condition is of interest. The patient, a negro of 78, had been suffering from

[1] Surg., Gyn., and Obstet., vol. xxxiv., p. 597.

[1] Journal of American Med. Assoc., Sept. 2nd, 1922.

blastomycosis of the neck and face for about 12 years, during the last seven of which he had been under treatment with potassium iodide, as well as having twice been admitted to hospital for surgical removal of the skin lesions. No other pathological condition was found on either occasion, physical and laboratory findings being negative, as was also X ray examination save for the presence of some peribronchial and interstitial fibrosis, apparently of long standing. In September, 1921, the patient was admitted to hospital with a swollen left testicle, the swelling having developed about three weeks previously. There was some fluctuation posteriorly, but little tenderness, and the surgeons made a diagnosis of malignant or tuberculous disease of the organ. At the operation the tunica vaginalis was found to be thickened, the testicle itself being of about normal size and thickness; while the epididymis, which was soft and adherent to the scrotum, was swollen to several times its normal size. Microscopical examination of the epididymis showed invasion of granulomatous tissue which contained many plasma cells, leucocytes, and giant cells, blastomycetes being found in the latter as well as in and around the typical miliary abscesses that were present. Cultures from the pus contained in the epididymis also grew typical colonies of blastomycetes. Examination of the body of the testicle showed no histological change. The patient made an uneventful recovery, and at the time of writing there was no recurrence of the local trouble in the scrotum. One of the chief points of interest about the case, apart from the extreme rarity of epididymal involvement, was the lapse of 12 years before the occurrence of any metastasis. The authors also comment on the fact that the case would, on the general pathological findings, have been classed as tuberculous had not search been specifically directed towards the presence of blastomycetes, and hence the possibility that other such cases may occur unrecognised cannot be altogether overlooked.

THE HEALTH OF MAURITIUS.

Dr. T. B. Gilchrist's report just issued on the health of the colony of Mauritius during 1921 will recall the serious strictures[1] upon the sanitary administration of the island passed by Dr. Andrew Balfour on a visit undertaken at the instance of the Colonial Office. The report itself contains evidence of sanitary work unobtrusively done in an outlying part of the empire, often with inadequate funds and under locally discouraging conditions. The birth-rate for the five years 1917–21 inclusive averaged 36·0 per 1000; the death-rate for the same period was 40·8. Thus, apart from immigration, the population, which at the Census of 1921 was 376,474, is declining. Unfortunately no figures appear to be available showing the age-distribution of the death-rate. The only clue available is the rate of infant mortality, which in 1921 was 177 per 1000 births, figures which, as is remarked in the report, "show conclusively that maternity and child welfare conditions in Mauritius are at a very low ebb." Malaria evidently is the predominant cause of death. Out of 15,159 total deaths in 1921, the number ascribed to malaria was 3564, to pneumonia 2067, to influenza 1563, to diseases of early infancy 1068, and to phthisis 945. A large proportion of the population are treated in or at hospitals or dispensaries, over 24 per cent. of the total population being thus treated in 1921. A partial spleen census of the children attending school was taken during the year, showing that at least 10 per cent. of the children were affected with malaria. Dysentery, although 497 deaths were registered as due to it in the year, is not a notifiable disease. Leprosy again is prevalent, but is not notifiable, and the medical officer of health found several lepers working and handling foodstuffs in Port Louis. He strongly urges the necessity for enforced hospital treatment for the poor suffering from this disease. Plague evidently is endemic. It caused 291 deaths in 1921, in the same year 375 cases being notified. Port Louis must be regarded as one of the endemic plague spots of the world. It is stated that prompt measures have been taken to deal with shipping and to prevent rats gaining access to the land from ships coming from foreign ports. The provision of tar guards and tarred canvas was rigidly enforced. This is quite consistent with the bad record of port sanitation in this and some other colonies. The disease is already endemic in these ports, and the essential need is the removal of the conditions allowing rat harbourage in and about the docks. It is not surprising to be told that for years past Port Louis has been proclaimed free from plague and then infected alternately; and this must continue to the serious detriment of the colony so long as the rat warrens, the slum property, and the honeycombed warehouses in and about the port are allowed to continue as at present. Local rats have been found, as might be expected, to be infected at the same time that stringent measures are being taken to prevent introduction of infection from without. Much sanitary work is being done, but unless this is systematised and made continuous on an adequate scale the devoted work of a limited staff can have but little effect. Educational effort combined with elementary sanitary work on a satisfactory scale are required for several years if Mauritius is to be raised above its present position of sanitary and, therefore, of commercial inefficiency.

[1] THE LANCET, 1921, ii., 1381.

THE TREATMENT OF HAY FEVER.

Hay fever is more prevalent in the United States of America than in this country. Here there is only the June fever, produced by grass pollen, whilst on the American continent there is a group of later fevers brought about by indigenous flowering composites, such as rag-weed and golden-rod. In a paper[1] by Dr. Harvey M. Hall, formerly head of the Californian Department of Botany, a list is given of possible hay-fever plants in California alone, running up to 190 species of anemophilous plants. This list has been prepared almost exclusively from the botanical point of view with the intention of affording a guide for clinical tests, using pollen extract to give a skin reaction. Moreover, it is claimed in America that the fever is also caused by the pollen of certain trees and that winter is the only season in which susceptible individuals may be considered free from danger. The present situation as regards hay fever is discussed in a series of four articles in the *New York Medical Journal* for August 16th. The opinions of those who have given attention to the question in America seem to have crystallised on the point that prophylactic treatment yields the best results. Dr. R. O. Clock (Pearl River, N.Y.) refers to L. Noon's[2] work, as showing that desensitisation with pollen extracts was possible, and that by this means the onset of hay fever could often be prevented entirely. Dr. Clock has himself shown that the early aqueous pollen extracts were unstable, and he claims to have succeeded in preparing a stable pollen antigen by extracting the dried pollen with a mixture of glycerine 2/3 and saturated NaCl solution 1/3. The use of standardised antigen so prepared has given good results. Dr. William Scheppegell (New Orleans, La.), who is president of the American Hay Fever Prevention Association, deals with the causes of failure, which he tabulates thus: Indiscriminate use of pollen extracts; lack of judgment regarding the size of the progressive immunising doses, and neglect to recognise multiple pollen infection. He advises the supplementary use of catarrhal vaccines when necessary. Dr. A. L. Rubenstone (Philadelphia) records his favourable experience with catarrhal autogenous vaccines in conjunction with pollen treatment. The fourth paper, by Dr. M. D. Touart (New York), is concerned with desensitisation by ingestion of pollen protein. He has had some success with the administra-

[1] Reprint No. 739 from the Public Health Reports, 1922, Washington Government Printing Office.
[2] THE LANCET, June 10th, 1911.

tion of pollen protein by the mouth. From a study of the whole series of papers it certainly appears that American investigators are making some progress in the practice of hay fever therapy. The best hope lies in the prophylactic inoculation of the expectant patient with the specific protein which caused the condition.

ARTHRO-TYPHOID.

IN a recent Paris thesis Dr. André Nikonoff[1] describes the second case on record of "arthro-typhoid," a term employed by Robin on the analogy of pneumotyphoid and pleurotyphoid to designate that form of typhoid infection in which the symptoms resemble those of rheumatic fever. The first case, which was described by Barjon and Lesieur, occurred in a youth aged 17, who had previously had an attack of rheumatism, the course of which resembled that of typhoid fever. Seven years later the same symptoms reappeared, but the pains in the joints diminished and the typhoid state developed. A blood culture showed the presence of the typhoid bacillus. After 28 days' illness, in which the joint pains never completely subsided, death took place without any hæmorrhage, and no lesions were found in the spleen or intestines. The case described by Dr. Nikonoff also occurred in a youth aged 17, who was admitted to hospital for arthropathies of the knees, tibio-tarsal and mid-tarsal joints. Seven days after the onset the patient developed pulmonary congestion and subsequently pneumonia of both lungs, characterised by intense dyspnœa, with respirations of 40–50. Shortly afterwards he began to have a number of profuse and repeated hæmorrhages consisting in hæmaturia, epistaxis, melæna, ecchymosis, and meningeal hæmorrhage. Culture of the blood showed the typhoid bacillus, and Widal's reaction was positive. No fluid could be obtained from the joints for cultivation. The autopsy revealed ulceration throughout the intestines, consolidation of both lungs, an enlarged spleen, and myocarditis. The case is thus the first on record in which, after a clinical course entirely different from that of typhoid fever, the specific organism was isolated during life, and the characteristic lesions of typhoid were found after death.

THE FITNESS OF FOOD-HANDLERS.

A RECENT bulletin (August 5th) of that cheery pedagogue, the Chicago School of Sanitary Instruction, is devoted to the health of food-handlers in relation to the general health of the community. The departments of health of New York and several other American cities have for several years enforced, with varying success, the periodic physical examination of all those concerned in handing food to the public, and in a recent article in the *Journal of the A.M.A.* Dr. L. B. Gloyne, Commissioner of Health in Kansas City, relates the results of the action taken in that city of 325,000 inhabitants. The ordinance has there been working for about a year, during which 1860 food-handlers were examined by the city health department and 249 by private practitioners. 112 other persons so employed were found to have left the city or to have ceased that form of employment just before the ordinance came into operation, because—in Dr. Gloyne's opinion—they were diseased and knew they could not pass the examination. From Nov. 1st, 1921, up to about May, 1922, 762 further examinations by the health department and 34 by private practitioners were made. In 61 cases the department refused permits; the family physicians refused none, nor did the persons examined by the latter undergo Wassermann tests, sputum examinations, or other forms of laboratory investigation. In consequence Dr. Gloyne recommended that all examinations of food-handlers be carried out by the health department, and naturally met with opposition from some of the local medical men, who felt that his action was an infringement of the right of the individual to choose his own physician. Dr. Gloyne gives some remarkable examples of the results achieved by the health department. In one restaurant all the waitresses were infected with venereal disease, and investigation disclosed the fact that waiting at table was only a part of their occupation; in 12 instances persons who were refused permits began treatment immediately and were later certificated as fit for work. A baker with a syphilitic ulcer on his shoulder required seven months' treatment before he was able to return to his usual occupation. All restaurant and grocery employees and druggists (if the latter are soda dispensers) are required to be examined. A further step in the safeguarding of public health is suggested by Dr. Gloyne—namely, a mental test which will necessitate study of certain elementary sanitary principles by the food-handler before he may submit himself to physical examination. Lectures or health talks are thrown away on persons of low mentality, and it is not surprising that very few of such persons were found capable in Kansas of undertaking the responsibility of preparing food for the public. Their exodus to neighbouring States to carry on slipshod and risky work may serve to stimulate other health authorities and lead to unification of public health procedure.

[1] Thèse de Paris, 1922.

THE WAYS OF THE SAVAGE.

THE old divines displayed infinite acumen in justifying the ways of Providence to man. No one so far has taken much trouble to justify the ways of man to himself. It has been left to the cinema photographer to do so, quite unconsciously, in "Nanook," the drama of actual contemporary savage life now being shown at the New Gallery, Regent-street. Nanook is the head man of a small Eskimo community in Ungava, and should appeal to all who, in youth, rejoiced in Ballantyne's "Young Fur Traders" or "Ungava, a Tale of Eskimo Land." Nanook justifies many customs in their origin, however much certain social reformers may condemn them in their later corruption. To begin with he gives the motive for the procreation of the species, for an Eskimo must keep up a family of a certain size in order that there should be a posse of men, women, and big children at hand sufficient to help in hauling a walrus or a seal out of the sea. Nanook, however, is an enemy to over-population, for the good reason that he can only manage to feed a certain number of mouths. Cannibalism is only a dim tradition among the Eskimos, as among the Australian blacks, because to eat men lessens the labour supply. War similarly does not appear to be in favour with early or primitive man, nor is homicide common, where parties of isolated tribesmen must be kept up to a certain quota. In Nanook's person kingship, aristocracy, and the rule of the best brains are justified, for he does everything and plans everything for his dependents. Sport with its excitement, allied to blood-lust, is the sanction of the primitive and never-ending struggle for food. We see Nanook chuckling while engaged in a desperate struggle with a seal, which he has to "hold up" like a trout, at the end of a short line. In the distance his family break into a run and come to his help only just in time to prevent him becoming exhausted with the fearful rough-and-tumble of his contest with the hooked prey. Ravenous meat-eating is justified, for he and his tear their raw seal flesh with magnificent gusto when they are starving. Vegetables they have none where the seal is caught. Primitive man is necessarily carnivorous. Games are justified, for Nanook's children toboggan to keep out cold, while he builds them an igloo or ice-house in the space of an hour. It is round in shape, like the beehive hen-houses in Dingle, Co. Kerry, but its elaborate formation plainly offers less resistance to the blizzard than would a rectangular house. It is small and perfectly airless within, since spaciousness and air are undesirable with the thermometer well below freezing-point. Thus retrospectively modern proletarians are justified in their dread of ventilation; they need only point to the shelters of their ancestral primitives. Nanook justifies, too, the world-old and

world-wide dislike of washing, since to wash in a freezing igloo interior is most unpleasant. The origin of medication is well shown, when Nanook's children have overeaten themselves quite justifiably after long starvation, and one of the boys is given a dose of castor-oil by a white man. The look of ecstasy on the boy's face as he swallows the hideous oily draught is touching, and suggests that early physic-taking was regarded as a luxury. But though there is little that is medical in this film, it should appeal none the less to medical men, as showing how most of the habits and prejudices of the average uneducated patient have arisen. The primitive ancestor of our kind was virtually an Eskimo, and he has left his impress on all succeeding generations.

THE HÆMOLYTIC STREPTOCOCCI.

H. Schottmüller showed in 1903 that the streptococci could be split into two main groups, according to whether they did or did not possess the power of producing lysis of red corpuscles. The organisms endowed with this power are known as the hæmolytic streptococci. Shortly after the discovery of this grouping M. H. Gordon, in this country, put forward his scheme of classification which was largely accepted by F. W. Andrewes and T. J. Horder in their pioneer work upon the classification of a number of organisms of this group obtained from a wide range of conditions. These investigations combined the series of tests advocated by Gordon with Schottmüller's differential criterion and split up the genus streptococcus into seven large groups. One of these groups, to which was given the name *S. anginosus*, was found to be particularly associated with scarlet fever and is essentially a hæmolytic organism. The test of the desirability of such groupings as those introduced by Gordon, Andrewes and Horder, and extended and modified by an almost inexhaustible host of subsequent workers, is the practical question of their value in medicine and their meaning in relation to diseased conditions. The verdict of subsequent experience would seem to be that these divisions are to some extent arbitrary and unnecessary, although in other directions of real practical value. Omitting from consideration the non-hæmolytic streptococci in which certain groupings correspond to certain sites and types, and in which pathogenic power is, broadly speaking, not marked, the evidence before us at the present time points to the conclusion that the grouping of Schottmüller is of especial practical value and that in a general way it is in the hæmolytic class that the most virulent members of this large family are found. At present there is a tendency towards the further subdivision of this hæmolytic class into constituent groups, but no strong case has yet been made out for the practical gain which would follow such a subdivision. Last week in our columns attention was drawn by Dr. E. Wordley to the unusual frequency of hæmolytic streptococci in the fæces of patients suffering from scarlet fever and nephritis. It is well known that the streptococcal flora of the fæces is very variable, and that chemical and mechanical disturbances of the alimentary tract cause changes in its bacterial content. The oral forms do not normally appear in any large numbers in the stools, although an attack of diarrhœa may result in their temporary predominance. The organisms described in Dr. Wordley's scarlet fever patients are in all probability hæmolytic mouth forms, so abundant in this disease, which have succeeded in passing through the alimentary canal alive. The high degree of incidence of kindred organisms in nephritis is of considerable interest and deserving of further investigation. Apart from these considerations the matter is further complicated by the great disturbance of metabolism which must be associated with the œdema and diarrhœa met with in these cases—conditions which in themselves might favour the existence of an abnormal flora. For such reasons critical investigation is necessary before the true significance of these interesting observations can be fully understood.

PHOBIAS:

WITH THE HISTORY OF A TYPICAL CASE.

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THE description of phobias in medical text-books leaves them as inexplicable curiosities, and the sufferer from them often meets with no understanding and little sympathy. Many phobias, indeed, pass unrecognised because the patient feels unable to admit them, even to himself, and seeks an expression of his fears in physical terms; some people avoid public assemblies on the ground that the close air affects them, but in a patient whose mental state is being investigated a closer inquiry will perhaps reveal that it is fear of crowds that causes the dislike. I have known a neurotic patient (the word *neurotic* is objectionable for several reasons, but there is no sound alternative) whose unreasonable summoning of her attendants as soon as she was left for a few minutes depended upon a fear of being alone, which was only revealed when she knew it would not be derided. Phobias are not rarities, and the eccentric behaviour of neurotic people is often better understood when the existence of a phobia is revealed. Their variety is endless, and their severity varies from a slight "nervousness" to a condition in which a state of terror is induced by the specific stimulus. I have had two patients with a phobia of the buzz of a fly, and on an occasion when one of them was in my room I purposely closed the window and imprisoned a stray bee. As the insect drummed on the pane the patient, who had once possessed sufficient courage to win the D.C.M., cowered in his chair and sweated with terror; his condition was so pitiable that I at once opened the window, and regained his confidence only by assuring him, with truth, that I had not realised what a serious thing his fear was.

The commonest phobia is fear of the dark, so common that to many people it seems a natural heritage of man; I have so often removed this fear by finding a definite cause that—being myself influenced also by the fact that I enjoy the dark—I always regard it as pathological. But the fear may be so potent that the sufferer regulates his comings and goings in order that he may not offend it; one patient worked through his lunch hour in winter so as not to be away from home after dark, and I have known a military patient bribe someone to walk to the hospital with him when he has stayed out alone.

The Nature of Phobias.

The essential quality of a phobia is that it has no reasonable cause; most patients recognise it as unreasonable, though some will make an attempt to rationalise and produce plausible but flimsy explanations. A man who has been kicked by a horse and afterwards purposely avoids a situation where the incident may be repeated is not suffering from a phobia, for his action is dictated by reason though his caution may be excessive; but a man who bolts up a side street when he sees a horse fall, and admits there is no cause for his hurry, except fear of something he cannot understand, is the victim of a phobia. To a sensitive person this recognition of the inadequacy of the exciting cause adds to the distressing effect. The unreasonableness of the phobia is beautifully pictured in Shylock's words:—

> Some men there are love not a gaping pig;
> Some, that are mad if they behold a cat;
> And others, when the bagpipe sings i' the nose,
> Cannot contain their urine: for affection,
> Mistress of passion, sways it to the mood
> Of what it likes or loathes. Now, for your answer:
> As there is no firm reason to be render'd
> Why he cannot abide a gaping pig;
> Why he, a harmless necessary cat;
> Why he, a wauling bagpipe; but of force
> Must yield to such inevitable shame
> As to offend, himself being offended;
> So can I give no reason, nor I will not,
> More than a lodg'd hate and a certain loathing
> I bear Antonio, that I follow thus
> A losing suit against him.

War Phobias.

Shakespeare uses the word *affection* in the sense in which psychologists use the word *affect*. Affect is the feeling-tone attached to a particular group of ideas; a phobia is a result of the displacement of affect, primarily belonging to a group of ideas of which the patient has no conscious knowledge, to an object of which he is aware. In the war cases the phobias were often derived from actual war experiences, forgotten or repressed, which were easily brought into consciousness. The phobias, like other symptoms of similar origin, were removed by these means, but experience has shown that the removal of the symptom was not always the same thing as the cure of the patient. I believe, and my belief is founded upon an experience of this matter which is now extensive, that in the case of men of good stamina these methods served to set them on their feet again, and they were saved the deterioration that a continuation of the symptoms would have induced. In those lacking in stamina, as shown by pre-war tendencies to "neurosis," the treatment produced only temporary improvement, and the flight from the difficulties of reality was not permanently arrested.

In war cases the phobia was usually attached to an object or condition which resembled or symbolised the repressed material. The fear of the buzz of a bee was, in the case referred to above, definitely derived from repressed memories of the sound of German planes, though the man had never been aware of the resemblance of the two sounds. In some war cases the symptoms existed before the war and were traced to repressions of childhood memories, and in all the cases the question might well be asked why in a particular patient a particular incident should be repressed and serve afterwards as the source of an affect which, displaced to another object, finds expression as a phobia? For example, the late Dr. W. H. R. Rivers published a case of claustrophobia[1] which depended upon the patient having been shut in a dark passage, the memory of the incident being totally repressed. I had a similar experience, before the age of four, which left an impression upon me, but which I have always clearly recollected, and, as I have already indicated, I have no fear of the dark. Why this difference? So long as the phobia is considered as an isolated symptom no answer is possible, but Dr. Rivers plainly indicates that his patient was, both before and after the removal of the phobia, in a state of anxiety, and that the phobia was only one symptom of this anxiety.

Phobia a Symptom in Different Pathological States.

An axiom that I often stress is that *the psychoneurotic symptom never stands alone*, and a phobia is only a part of a symptom-complex that depends largely upon the patient's general disposition. An apparently simple hysteria, such as aphonia or a paresis, may be associated with a phobia which develops whilst the original symptom remains unchanged; or the removal of the symptom by suggestion or persuasion, or by no obvious agent other than the lapse of time, may be followed by the onset of the phobia. Sometimes investigation of a hysterical symptom shows that it arose as a defence against a phobia, as in one patient whose fears were so many and so insistent that she became paraplegic and took to her bed in order to escape from the circumstances that induced them. The experience that has taught me these facts has also taught me to be chary of expecting to "cure" a hysteria by a direct attack upon it, or, rather, upon the patient; yet I still believe that a bodily hysterical symptom should be vigorously checked at its onset, for with the persistence of the symptom there is a definite deterioration of the patient's resistance against the difficulties that have excited it, and further symptoms grow whilst the first remains active.

People of a certain disposition do not, however, tend towards bodily hysteria, but show only anxiety symptoms throughout. The anxiety may be generalised from the beginning, and the patient who describes himself as "nervous" or "depressed" will, if questioned closely and with understanding, admit that "nervous" means "full of fear," and that in his attacks of depression he feels "something is going to happen," or he is afraid and "doesn't know what he is afraid of." Here is an unattached fear affect, which, however, tends to fix upon an object and produce a definite phobia whilst the chief character of the case is still that of general anxiety. It is in these cases that we see those physical signs of anxiety of which the army "disordered action of the heart" affords an excellent example; most of the men with this diagnosis present definite anxiety states with pathological fears of varied kinds, and when the cases are investigated from the mental aspect the heart syndrome fades into insignificance, though the men often attribute to their supposed heart weakness what are really the manifestations of fear.[2]

Hysteria and the anxiety state do not exhaust the conditions in which phobias appear; the obsessional state (usually called *obsessional neurosis*, though I cannot extract any meaning from *neurosis* in this connexion) is found in people of a disposition totally different from that of the hysteric, people often of high intellectual attainments and considerable insight into their own condition who do good work in spite of their trouble. An obsession, like a phobia, is felt to be inadequate and unreasonable, and the two are often found to exist together. Sometimes a phobia is the obverse of an obsession; a fear of knives or bridges, for example, may, when viewed from another aspect, prove to be a suicidal obsession. Lady Macbeth's reproach—

> Art thou afeard
> To be the same in thine own act and valour
> As thou art in desire?

illustrates this ambivalency as present in full consciousness. If we can picture Macbeth as having repressed his murderous desire, and successfully denying to himself that it ever existed, the fear affect attached to the now unconscious desire might arise into consciousness and we should find, perhaps, a phobia of knives. Fear and desire, phobia and obsession, are to one another as the obverse and reverse of a coin.

The obsessional patient often succeeds in keeping his obsession or phobia in a close compartment, unlike the anxiety sufferer, who lets his affect flow over into all his relations with the outside world. A patient, unable to cross a field alone on account of his agoraphobia, assured me that his army service was the happiest period in his life, for he knew he need never be more than a few yards from another soldier. The narrow limits of his symptom were shown by the fact that the companion whose presence would save him from the fear must be a grown man, not a boy or anyone of the opposite sex.

A Phobia of Cats.

Before describing the case which has led to this lengthy preamble I must point out that the three groups mentioned above are not as well defined from each other as perhaps I have made them appear. They are not "clinical entities," but are useful to indicate the type of patient that we are dealing with. It will be seen that the case in question is easily placed in the group of hysteria.

Symptoms.—I was first interviewed by the patient's daughter, who described her mother's phobia of cats, and declared that her mother had never had other nervous trouble; she had been through much physical illness and had always borne it well. This statement became interesting when the full history was obtained from the patient herself. She was aged 45, and one of four children; the father was a clever man in his profession, but drank to excess and became insane; the mother died of phthisis when patient was ten years old. She became deaf at 15, and now uses an

[1] See THE LANCET, 1917, ii., pp. 237–240.

[2] See the Psychological Aspect of the Effort Syndrome, THE LANCET, 1920, ii., 184.

electrical apparatus for hearing; at 18 she was in a private hospital with a painful spinal trouble, which was treated by massage and electricity and has persisted irregularly ever since. Married soon after, she had two children and made heavy weather of pregnancy and lactation; especially striking was a description of her painful nipples, the doctor declaring that there was nothing wrong with them. "He made me put the baby to the breast, and in half a minute he was holding his hands to his ears, and said to the nurse, 'Take him away, take him away.'" Her coccyx was excised for some painful condition, and a third pregnancy was artificially terminated because her back became bent and could not be straightened. A "clever German surgeon" now opened her abdomen and found every organ of her body displaced. A spell of paraplegia led to the dismissal of a doctor who told her to get up and walk, and five years ago a phobia of cats appeared during some indefinite illness, following immediately upon a difference of opinion with a medical man who was annoyed with her and forcibly expressed his annoyance.

Truly, the psycho-neurotic symptom never stands alone. The phobia was one among a mass of hysterical manifestations, and only the impossibility of viewing it as organic disease had driven the patient to psychotherapy. It was now so severe that a sight of the animal produced a state of collapse lasting over three days, but of late the effect had tended to be a repetition of the old spinal trouble. As the patient put it, "The sight of a cat affects the nerves of my spine." Her husband assured me that he kept three dogs trained to hunt cats, and that the proximity of a cat produced such a state of terror in his wife that he believed she would die or become insane if one ever jumped upon her. During sleep she would start and groan if a cat made music outside the house, and on waking would suffer just as if she had met the animal. The phobia had been treated by many physicians, and as a last resource it had been proposed to inject cat serum in the hope that it might help her "by suggestion."

Treatment.—The deafness, whatever its basis, was largely mental, as shown by her reproducing sounds with alterations that could not depend upon interference with the intrinsic organs of hearing; a sharply interrupted "ah, ah," for example, was reproduced as a long-drawn single sound, though if it were heard at all the interruption must have been heard. Such changes in reproduction are characteristic of hysterical deafness, but do not exclude an organic defect. I decided, purely for facility in subsequent treatment, to try methods of persuasion for the deafness, but I failed to influence it, and was obliged to undertake an analysis under very difficult conditions. The patient, however, proved reasonable, and did her share of the work with a determination to rid herself of this terror that made her life a constant apprehension. She showed a typical hysterical personality—shrewd and practical in many respects, and honestly desirous of being cured at any cost to herself or her feelings, and, on the other hand, full of evasions and ready at any time to take refuge in her symptoms. On the whole she applied herself in earnest to the painful task of unravelling the cause of her troubles.

An outstanding feature of her memories was an episode when her father, alone with her in a closed carriage and excited by drink, behaved violently because she refused to meet a woman with whom he had an intrigue. Later on there came an episode involving sexual stimulation, followed by the first attack of spinal trouble. Marriage took place at about 23, and conjugal life was apparently successful, though interrupted by separations through business reasons, by the hysterical illnesses, and by a period of unexplained dyspareunia. She revealed herself as possessed of a strong but normal sex instinct, and repeatedly dwelt upon the type of man who attracted her—big men of masterful ways, of whom her husband and her father were examples, though only of recent years had she been friendly to her father. The only cat that appeared in the story belonged to him, but there were no emotional associations with it. She dwelt upon her symptoms, and it gradually transpired that there were two phobias: one, towards tabby cats, was accompanied by sheer terror and collapse, whilst towards black cats there was an attraction with fear of "giving way to it." Cats now appeared in her dreams, and the eyes of the cats recalled the eyes of her father and of the man concerned in the episode before marriage. Concerning this she had hitherto denied emotion, but now she came to admit it, and also that the attraction to the black cat had a sexual significance; she recalled caressing such a cat at the time of the episode, and admitted now that the spinal pain had always coincided with periods of sex disturbance. This last admission was for a long time avoided, whenever she seemed to be approaching it, by the defence that an eminent physician had told her the pain was due to "exhaustion of the nerves of the spine." Such a diagnosis is full of comfort to the hysteric, and as her own talking led her to the disagreeable truth she developed a resentment towards me that led her to break off treatment; it needed the persuasion of her medical attendant to induce her to return to me.

The black cat phobia was now coming under control, but the other terror was as strong as ever; still, a good deal of material had been brought up, and the fear of the cat was seen to be related to her father and to indefinite sex ideas. Then one day she appeared with a beaming face and announced that she had sent a telegram to her husband saying, "I stroked a cat to-day." She had dreamed of a fire two days before, and woke up in a fright; by associating on this dream, in the way she had learnt, she brought a whole series of incidents into consciousness. When she was about eight years old a brother had set light to some curtains; her mother was in a bathroom, and the girl beat upon the door and cried out that the house was on fire. The mother rushed out unclothed, and the sight of the naked adult made a great impression upon the girl. Soon afterwards she asked that she might no longer be bathed with her brothers, and arrangements were made for her to bathe alone. The patient talked at great length about her reasons for this request, which had not been clear to her at the time, and recognised that it was motivated by sexual fears in which speculation and phantasy played a great part. One day, when she was undressed in the bathroom, a tabby cat jumped in at the window and approached her; she shrieked in terror, but had to unlock the door before anyone could come to her help.

Here was the incident underlying the phobia; the previous work had, however, already helped to the understanding of what significance underlay the incident. Fear of her sex thoughts had already been linked up to fear of her father, and her preference for men of the same type as the father showed that in this fear there was an ambivalence—fear and desire are again two sides of the same coin. The tabby cat was a symbol of the fear; the black more nearly symbolised desire. How the incident with the medical man revived the fear was clear; he was a big man of the bluff and hearty type, and when a cat appeared in her room, just after a stormy scene with him, the associations were sufficient to start the symptom.

The phobia has gone, and patient and husband are grateful. But, although there is a notable alteration in the outlook of the patient, and her friends regard her as cured, yet she knows that many of her other symptoms have not found explanation; the deafness has defeated me, and I rather regret that the removal of the symptom for which she undertook treatment occurred before the cause of this other persistent trouble was unravelled. It is not possible within a reasonable space to give more than the outstanding points in the analysis, but we can see in this particular case why an incident which would have been insignificant to most girls was repressed to become the foundation of one symptom in a hysterical syndrome.

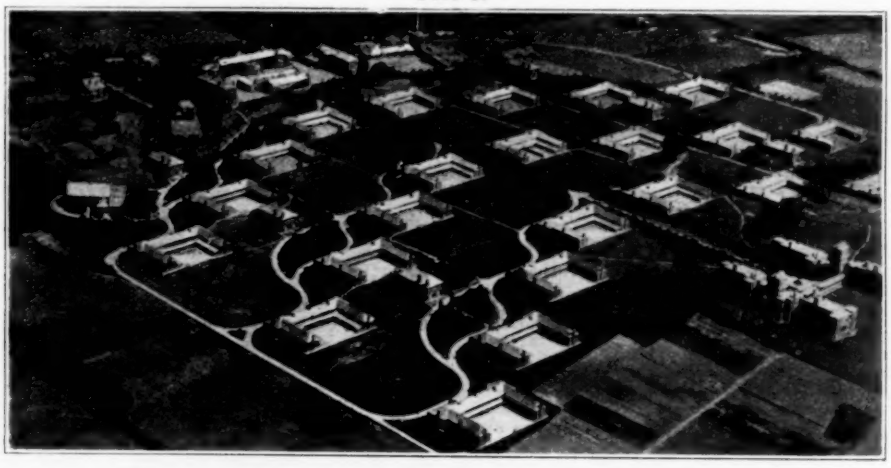
SURGICAL TUBERCULOSIS IN CHILDREN: THE WORK OF THE M.A.B.

QUEEN MARY'S HOSPITAL FOR CHILDREN, CARSHALTON.

THIS hospital, which is by far the largest of the Metropolitan Asylums Board institutions for children, is situated at Carshalton, on the Surrey Downs, in a park of 136 acres. It was originally designed for use as a convalescent fever hospital, but partly owing to the fact that a change of circumstances freed another hospital for this purpose, and partly because the medical superintendent, Dr. W. T. Gordon Pugh, felt that the hospital could be used to far better purpose, the scheme was given up. In July, 1908, it was proposed by the Local Government Board that, in view of the pressure on the accommodation for sick poor in the metropolis, the Metropolitan Asylums Board should, as a means of relieving that pressure, provide accommodation for such sick children as were suitable for removal, and this being agreed to, the hospital at Carshalton was utilised in the following year.

The hospital contains 810 beds, the accommodation being provided in 16 ward blocks and in two isolation blocks. In addition to the administrative block and two large staff homes, six small staff homes are provided, one attached to each of the six "streets" of blocks, and each containing the quarters of the home sister in charge of the "street," and ten bedrooms for domestic staff. The ward sisters working in the hospital also have sitting and bedroom accommodation in these staff homes. The administrative block is placed in a central position, a main central avenue running north and south, connecting both it and the kitchen and stores block in the rear of it with the two isolation blocks which lie at the extreme southern part of the hospital. From this central avenue six "streets," arranged *en échelon*, give access to the six ward blocks and staff homes attached to them. (Fig. 1)

FIG. 1.



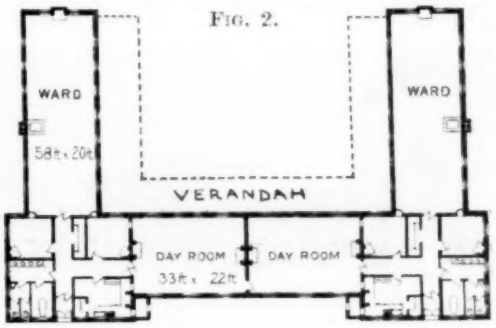
Queen Mary's Hospital for Children, Carshalton, from a photograph taken from the air, showing the six échelons of ward blocks. The hospital blocks are seen on the right. The administrative, kitchen, and staff buildings, &c., are grouped at the far end of the grounds.

In 1912, verandahs, each containing 30 beds, were added to ten of the ward blocks (see Fig. 2), thus enabling 300 children to lie in the open air, winter and summer, day and night, almost completely free—as the latest annual report of the Board points out—from colds and from infectious diseases. Competition for these verandah beds is very keen in the summer months, but even in the winter the children get accustomed to the open air and thoroughly enjoy it.

Direct Sunlight Treatment.

The hospital being primarily intended for cases of surgical tuberculosis in children, extensive use is made of direct sunlight, the courtyards, open only to the south, with the verandahs on the three remaining sides, being ideal for the carrying out of this treatment. The patients present every degree of pigmentation, although a succession of sunless weeks such as have recently occurred naturally modify this to a

FIG. 2.



Ground plan of "double cottage" ward block.

large extent. Dr. Pugh has not found that the degree to which pigmentation occurs bears any relation to the prognosis, as is popularly believed to be the case. The special orthopædic carriages designed by Dr. Pugh for use in spinal caries, and described by him some months ago,[1] have proved of the utmost value in carrying out sunlight treatment, and requests for a pattern or specification of them are constantly being received from almost all parts of the world. Their special features are designed to obviate the usual drawbacks common to most of the appliances in general use in spinal caries, these drawbacks including flattening of the chest, wasting of the muscles of the lower limbs, over-extension of knee, talipes valgus, and flat-foot. Special modifications are employed according to the degree of deformity present and to the location of the disease—e.g., in cervical caries extension of the head is effected by the weight being connected with a strap passing round the forehead instead of under the chin—the latter method, which is more commonly employed, seriously interferes with the development of the lower jaw (see Fig. 3.)

The apparatus is made in the hospital workshops, where practically all the appliances in use are constructed, including the wonderful plaster and celluloid (non-inflammable) splints, and the special adjustable crutches designed by the medical superintendent.

The results of treatment of tuberculosis of spine and joints are very striking, especially in the cases taken in hand at an early stage of the disease. The large number of patients with more or less pronounced humps demonstrate the frequency with which cases of spinal caries are sent in at an advanced stage,

[1] THE LANCET, 1921, i., 1071.

necessitating prolonged and costly treatment and involving some degree of permanent deformity. Considered from the point of view of mere economy it would be cheaper to send early cases of surgical tuberculosis for treatment to such an institution when a permanent cure may be expected in a much

FIG. 3.

Showing treatment of case of cervical caries. Extension of the head is effected by a weight connected with a strap passed round the forehead, to obviate interference with development of the lower jaw by a band passing under the chin. Each child is provided with a small hand-mirror to enable it to see what is going on around without sitting up.

shorter period of time with little or no resulting deformity.

Scope of the Hospital Work.

Although Queen Mary's Hospital is, as has just been stated, primarily intended for the treatment of surgical tuberculosis, it is by no means confined to such cases, with the result not only that the 810 beds are always full, but also that there is a long waiting list for vacancies. The hospital undertakes practically the whole of the general surgery for children from other M.A.B. hospitals, as well as for the 600 boys on the *Exmouth*, an average of 600 operations under a general anæsthetic—from 300 to 400 of which are for non-tuberculous conditions—being performed during the year. The hospital possesses the advantage over most voluntary and private institutions of being able to keep in patients almost indefinitely, taking in a large number of cases given up elsewhere. In the gymnasium and massage department patients suffering from spastic paraplegia, infantile paralysis, kyphosis of all degrees, flat-foot, and many other pathological conditions are given appropriate exercises and gymnastics by a trained staff; while another part of the same building is given up to electro-therapeutical treatment, from zinc sulphate ionisation for otorrhœa to the new portable physiocoil, giving 60 to 1800 breaks a minute. A large operating theatre has recently been opened with modern equipment, including the new skialytic lamp, which can be used in broad daylight, and which gives intense illumination while casting no shadows.

Radium Treatment of Glands.

A large number of children with tuberculous glands are admitted to Queen Mary's Hospital, many of them with a recurrence of disease after operation. These cases are now being treated with radium, an applicator containing 15 mg. of radium bromide having been purchased by the Board in 1920. The radium is applied once a week for four hours at a time to each gland to be treated, and the applicator being very small and therefore liable to be mislaid, the rule has been made that it is to be in constant use, and is only to be removed from one patient to be applied immediately to another. An elaborate time-table is made out every week showing at a glance which patients are due to receive the radium for each period of four hours, a register also being kept of the number of applications given in each individual case. Caseous glands need, as a rule, from 40 to 50 applications, simple glands not requiring so many. The results of the treatment have been found satisfactory on the whole, especially in the less advanced cases, while the average cost of treatment works out at 5s. for each gland.

Several cases of lupus are admitted every year to the hospital, the treatment for this disease being a thorough scraping, followed by an application of acid nitrate of mercury. In a few neglected cases with extensive ulceration a plastic operation is needed after the disease has been arrested.

Education of Patients.

While the average stay per bed is one year, a large proportion of the patients remain under treatment for four years or more—the maximum age of 16 not being rigidly construed in practice; as many of these children have spent much of their lives previously in hospital it is obvious that they would be quite illiterate if they were not taught here. Indeed, the need for expenditure on education was shown by a report in 1920 of 192 very backward children over 11 years of age who were admitted, the retardation in 79 cases being three years, in 54 four years, and in 59 five or more years. Some in the last group, however, were probably mentally defective. There is a full-time staff of 21 teachers, the yearly expenditure on education being £6000. Teaching is carried on in 20 wards, where the great majority of the children are in bed, and in the hall, where the convalescent cases attend, many classes also being held in the open courtyards

FIG. 4.

Sun treatment; a class of girls in the courtyard of a ward block.

(see Fig. 4). The curriculum is kept as wide as possible, and includes many varieties of handwork. Every child's progress in reading, writing, and arithmetic is now tested and reported on twice a year, and record is kept for the whole period of its stay, being passed on from ward to ward as the child is transferred. These records show a good average progress during the year, especially when the limited school hours are taken into consideration, children who were very backward from lack of opportunity making good progress.

Any child under the age of 16 whose parents are resident in a London parish is eligible for admission to the hospital; application must be made to the Clerk of the Guardians of the parish, or, in the case of tuberculous disease, either to the Medical Officer, L.C.C., 2, Savoy Hill, W.C. 2, or to the Clerk to the Guardians.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

SECTION OF PHYSIOLOGY.

IN THE LANCET of Sept. 9th we published Prof. E. P. Cathcart's presidential address to this Section. Certain other interesting papers are abstracted below.

Prof. A. V. HILL, F.R.S., read a paper on

Athletics and Oxygen Supply.

He said that in attempting to analyse the factors which underlie muscular efficiency, most observers have been content to concern themselves with a consideration of the oxygen supply. They have devoted themselves to a study of the means by which fuel arrives at the engine rather than to a study of the behaviour of the engine itself. As a result of the work of W. M. Fletcher, F. G. Hopkins, and of Leonard Hill, we are now in a position to consider the broad question of athletic capacity from the details of the changes which we know to take place in the contraction of a single isolated muscle. We know that during the initial contraction of the muscle and the period in which this contraction is maintained, there is a liberation of lactic acid within the muscle, and that the actual contraction of the muscle is a consequence of the physical forces called into play by the appearance of this acid at various membranes or surfaces within it. The fact of great significance is that these processes in which the full force of the muscle is developed and maintained do not demand for their accomplishment any supply of oxygen whatever. While the muscle relaxes the lactic acid present is neutralised by the supplies of available alkali in the tissues, but not until the period after relaxation is complete does the oxygen consumption of the muscle begin. In this final stage in which the muscle is apparently at rest, a process goes on which may be compared to the recharging of an accumulator, for not only is oxygen consumed, but the lactic acid disappears and heat is developed.

A little reflection is sufficient to help us to realise that the sequence of changes in the isolated single muscle, in which the oxygen consumption only occurs during the final stage, has its counterpart in the processes going on in the body of a man running a race. When the running stops, he is "out of breath," that is to say, he still needs oxygen in excess of his resting requirements: he does not, from minute to minute during the race, obtain all the oxygen necessary to oxidise the lactic acid produced in the contractions of his muscles. If he runs slowly the process of removing lactic acid will be correspondingly facilitated, for this oxygen intake will be nearly sufficient to deal with all the lactic acid produced. If, however, he runs quickly, while he does not increase his oxygen intake, he does increase his lactic acid production, and this production will soon outstrip its removal. In other words, the runner will become fatigued. Fatigue, then, is seen to be due to the accumulation of lactic acid in the muscle, and the extent of a man's capacity as an athlete depends on the extent to which he can tolerate such an accumulation. His toleration for lactic acid will depend on the reserve of alkali which his tissues contain for neutralisation of this acid.

Prof. Hill was at some pains to point out the errors into which various observers have fallen by neglecting the oxygen consumption which takes place after running stops. They have assumed that the oxygen consumption per minute during the running represented the total energy requirement, and have in some cases arrived at the absurdity that quicker rates of running require less oxygen than do slower rates. Yet it is precisely *because* the oxygen consumption can to a certain extent lag behind the development of energy, it is *because* the isolated muscle can exert its full strength in the absence of oxygen, that a man can run 100 yards at a much greater speed than he can run one mile. An interesting confirmation of the view that fatigue is due to the accumulation of lactic acid in the muscles is obtained by considering the fact that a man of athletic frame can "run himself out" to such an extent that he requires at the end of exercise 10 litres of oxygen above his resting consumption; he will absorb this amount during the eight to ten minutes which follow the end of the exercise. Now the amount of lactic acid which this oxygen will oxidise can be calculated, and on the assumption that a man of 70 kg. weight is using 25 kg. of muscle, the calculation indicates that when an athletic man is exhausted, the lactic acid present will amount to 0·33 per cent. of his muscle weight. But Meyerhof has determined that the maximum percentage of lactic acid which can be produced by stimulation in isolated mammalian muscle varies from 0·3–0·4 per cent. The agreement between the two figures is very striking. The fact that a runner does not consume all the oxygen he requires for running until the exercise is over may be regarded in another light. One may say that the runner gets credit for oxygen. Let us suppose that before exhaustion he can get credit for 10 litres. Then, if during exercise he breathes in 5 litres per minute, it follows that in running for one minute he has energy corresponding to 15 litres of oxygen at his disposal. In running for five minutes, however, the energy available only corresponds to $(10+5\times5=)$ 35 litres of oxygen; that is to say, it corresponds to 7 litres per minute. Roughly speaking, the energy available per minute when running five minutes is less than half that available when running only one minute. Prof. Hill showed that it was possible to plot a curve showing the relation of the true oxygen consumption in running various distances at a maximum rate to the time taken. The distances chosen were those of the customary flat races. It was found that this curve was of the same general type as that obtained when the speed developed in the various world's records was plotted against the time taken. In other words, it was evident that the shape of this latter curve could have been predicted from considerations of oxygen consumption.

Mr. JOSEPH BARCROFT, F.R.S., gave a lecture on the

Recent Expedition to the Andes for the Study of the Physiology of High Altitudes.

He began his lecture by pointing out the reasons which had led them so far afield. A previous expedition to study the mechanism of the respiration in a region of greatly diminished oxygen pressure had gone to the peak of Teneriffe. There the only source of water was the melted snow, and there were no laboratory facilities of any kind. At Cerro da Pasco, on the other hand, a mining town situated at 14,200 ft. there were not only all the conveniences of an ordinary laboratory, but there was a native population which had been resident at the same altitude for generations. Some interesting examples were given of the effect of the diminished oxygen tension on animal life. Above 12,000 ft., fleas, which were plentiful below that height, disappeared: there were lice, however, and, at Cerro da Pasco, typhus was not uncommon. As the ascent to 14,000 ft. was made, the expedition passed in succession through areas (*a*) where there were cows which gave milk, (*b*) where there were cows which did not give milk, (*c*) where it was impossible for cows to live. The latter part of the journey was accomplished by the party in stages. The effect of the diminished oxygen tension at a height of 14,000 ft. was much greater on persons carried to that height by rail than on those who had, by walking, gradually acclimatised themselves. Consequently at the height of 14,000 ft., the members of the party went to bed for a day or two before going on to 16,000 ft., which was the height to be negotiated before arrival at Cerro da Pasco. There was, in the first place, a definite effect on the mentality of the party produced by the high altitude. All processes requiring concentration took roughly twice as long to perform. Similarly, the mentality of the natives appeared to be of a low order. All the natives were small in stature, and their most

striking physical feature was the large size of their chests. A man of 5 ft. 2 in. had the chest of a normal man of 5 ft. 11 in.; in all cases the ribs were permanently elevated as in a typical case of emphysema. The chests of Europeans who had gone to reside there also took on this shape. All the natives were thin, and in consequence of the arduous nature of their work in the mines their lives were short in duration.

The results of the various investigations carried out by the expedition were summarised. In the first place, the pressure of oxygen in the arterial blood was always less than that in the alveolar air, so there was no evidence that the pulmonary epithelium could secrete oxygen. Secondly, the pulse-rate when fasting and at rest was the same as at sea-level. There was no obvious increase in the rate of flow of blood per minute in the vital capacity or in the basal metabolism. The number of red cells in the blood increased from 5 million to 7 million (on the average), while the number of reticulated or young red cells rose from the neighbourhood of 50,000 per c.mm. to 150,000 per c.mm. In the natives, on the other hand, this relative increase in the reticulated cells was not observed; thus with a red count of 7 million a native would only have 80,000 reticulated cells per cub. mm. The specific oxygen capacity of the blood of various members of the party rose from about 17 to about 20. In other words, while at sea-level 100 c.cm. of blood became saturated by 17·0 c.cm. oxygen, at Cerro da Pasco 100 c.cm. of blood could take up 20·0 c.cm. oxygen. Various natives gave the figure 22·0 c.cm. Finally, the dissociation curve of the oxy-hæmoglobin of the blood of the various members of the party was shifted to the left. That is to say, at a given oxygen pressure the molecules of hæmoglobin clung more tightly to the oxygen at 14,000 ft. than they did at sea level. This shift in the dissociation curve, of course, disappeared when the party returned to sea-level, but it was imitated by shaking out the CO_2 in a given sample of blood, centrifugating the sample, and withdrawing a portion of the plasma; after again mixing the corpuscles with the remaining plasma, a redetermination of the dissociation curve gave the result obtained at Cerro da Pasco. It was evident that the shift of the dissociation curve was due to the fall in CO_2 tension in the alveolar air at 14,000 ft.

A joint discussion took place between the Sections of Physiology and Agriculture on

The Vitamins.

Prof. J. C. DRUMMOND, in opening the discussion, pointed out that plants were to be regarded not only as a machine for storing the energy of the sun, but that they were laboratories in which certain substances were prepared which the animal body was unable to make for itself. We knew the constitution of some of these substances, for example, the amino-acids, tryptophane, and cystin, but there were others, the identity of which was still obscure, commonly known as vitamins A, B, and C respectively. While two of these were only produced by the green plant, it appeared that the third could be elaborated by such low forms as yeasts and bacteria growing in simple culture media. On the other hand, the recent studies which showed that rickets could be cured not only by vitamin A but also by exposure to sunlight or ultra-violet light, suggested the possibility of a synthesis of vitamin A by animal tissues. Prof. Drummond uttered a warning with reference to the food of the industrial population of this country. While the consumption of milk per head was much lower than that of other countries, and the use of butter had been largely replaced by that of margarine, the most dangerous feature of all was the widespread neglect of fresh green foods.

Capt. J. GOLDING, D.S.O., gave an account of some experiments in which the importance of vitamin A was demonstrated in the rearing of pigs. Under the conditions of the experiments it was found that the growth and development of the young pig was not limited when it was placed on a deficient diet until the pig had exhausted supplies of vitamin A received from its mother during suckling and stored in its own body-fat. The pig's ability to store vitamin A when this was received in excess of immediate requirements was manifest. Other results showed that prolonged deficiency of the A factor might do irreparable harm in the matter of reproduction. A sow which had already given birth to a litter was placed for a considerable time on a deficient diet. Although later she received a daily ration of cod-liver oil, she was never again able to stand to the boar. While in practice the danger of vitamin deficiency was largely confined to sty-fed pigs it occurred in others. During last summer (1921) a big herd of pigs, kept on a dry upland pasture, were found suffering from failure of growth and joint trouble. They were at once cured by bringing them to a fresh green pasture or by giving them lucerne. Farmers were warned against artificial foodstuffs advertised as containing vitamins, for such advertisements were usually a cloak for a deficiency in nutrients. Apart from cod-liver oil, the farmer should look to his natural foods to supply vitamins.

PUBLIC PROPAGANDA AGAINST CANCER.

MANIFESTO AND LEAFLET OF THE LEICESTER HEALTH DEPARTMENT.

THE serious increase in the number of sufferers from cancer induced the Health Committee of Leicester a month or two ago to issue in the local press the following manifesto signed by the medical officer of health.

Press Manifesto.

There is no reason to fear that cancer is contagious. Although many alleged "cures" have been announced, there are none which have so far substantiated the claims made for them. Treatment by radium or X rays, though hopeful, is still in the experimental stage. The disease begins as a small localised substance or growth in some part of the body. It grows slowly or rapidly, spreads to surrounding tissues, and sooner or later secondary growths occur.

In the early or localised stage it is often quite possible for cancer to be completely removed by a surgical operation, but once the disease has begun to spread, the chances of complete removal are slight. Very many cases are found to have got beyond the curable stage when the sufferers first apply for treatment. In this disease immediate action is imperative, and delay is disastrous. Everything depends therefore, upon early resort to skilled medical advice, recognition of the disease, an early operation, and prompt treatment.

Leaflet Describing Symptoms.

Attention was called in the press manifesto to a leaflet to be obtained on application to the Health Department, Leicester, or from any of the health visitors. On the cover it is stated that the leaflet is issued because so many persons die from cancer whose lives could be saved if they acted upon the advice here offered. "The importance of this subject to the public is shown by the fact that of all deaths of persons over 40 years of age, one in nine is from cancer." The text of the leaflet runs as follows:—

CANCER.

It is vitally important that the following facts about cancer should be known.

It is now an established fact that of the number of persons who die each year from cancer many could have been cured if they had applied earlier for medical advice. On questioning patients as to why they did not apply to a doctor earlier, the reason almost invariably given is that, as the early symptoms were unaccompanied by pain, it was not thought that anything serious was the matter. In order, therefore, to call the attention of the public to the significance of certain symptoms, and to the vital importance of acting promptly on the occurrence of these, it has been decided to make the following facts public.

Practically, the only cure for cancer at present known is its early and complete removal. Its destruction by X rays or radium, though hopeful, is still in the experimental stage. Cancer, if removed early enough, has been proved conclusively to be a curable disease. If neglected, and not dealt with in its earliest stages, it is almost invariably fatal. The paramount importance of its early recognition and early removal

is therefore evident. For this purpose the assistance both of the public and the medical profession is requisite; and a grave responsibility rests on both. It is only by their mutual coöperation that the ravages of this terrible disease can be lessened. The following information is of vital importance to the public. It is no exaggeration to say that, if acted upon, the result would be the saving annually of many lives which at present are sacrificed.

1. Cancer, in its early and curable stage, may give rise to no pain or feeling of ill-health.

2. Nevertheless, in the commonest situations, the symptoms of cancer in its early stage are generally manifest.

3. If any swelling occurs in the breast of a woman, especially after 40 years of age, a medical practitioner should at once be consulted. A large proportion of such swellings are cancer.

4. If any bleeding, however trivial, occurs *after* the change of life it generally means cancer, and cancer which is then curable. If neglected till pain occurs, it means cancer which is almost always incurable.

5. If any irregular bleeding occurs at the change of life it should always be submitted to a doctor's investigation. It is not the natural method of the onset of the change of life, and in a certain number of cases means commencing cancer.

6. If any wart or sore occurs spontaneously on the lower lip in a man over 45 years of age it is almost certainly cancer. If removed at once the cure is fairly certain; if neglected the result is inevitably fatal.

7. If any sore or swelling occurs on the tongue or inside of the mouth in a man after 45 years of age it should be submitted to medical investigation without a moment's delay. It may be necessary to decide by expert microscopical examination as to whether it is cancer or not. A very large proportion of such sores or swellings occurring at this time of life are cancer, and if neglected for only a few weeks the result is too often fatal. If removed at once the prospect of cure is good.

8. If any bleeding occurs from the bowels after 45 years of age (often supposed by the public to be "piles") it should be submitted to investigation at once. A large proportion of such cases are cancer, which at this stage is curable.

9. When warts, moles, or other growths on the skin are exposed to constant irritation they should be immediately removed. A large number of them, if neglected, terminate in cancer.

10. Avoid irritation of the tongue and inside of the cheek by broken jagged teeth, and of the lower lip by clay pipes. Many of these and other local irritations, if neglected, terminate in cancer.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

The Claim of Medical Education.

Major E. W. C. Bradfield, F.R.C.S., I.M.S., who was deputed in 1921 by the Madras Government to visit medical institutions in the U.S.A., has brought in a valuable report. He was much struck by the American conception of a medical school which included active investigation of disease, whereas in India the need for research had been almost entirely obscured by the urgent necessity of individual medical relief. In their desire to keep the cost of medical education within a limited budget, the Government of India had failed to appreciate the fact that in order to inspire his pupils a teacher must himself be a worker. The American schoolboy, he found, was suffering from a series of intensive courses in which he learned something of many subjects and mastered none thoroughly. With such a basis the necessity in the medical school for an atmosphere of research and critical observation was patent, and this need was still greater in the case of the Indian student. At Johns Hopkins, with 360 students, the total cost per student to Government or college authority worked out at (in Indian money) 3800 rupees against 508 for the Madras Medical College, and 85 for the Tanjore Medical School. In American colleges the number of instructors stood to students in the ratio of 1 to 2·9; the corresponding figure in Madras was 1 to 16·5, and at Tanjore 1 to 22·1. The professor of surgery at Madras had to teach all the specialties, including laryngology, otology, and syphilology. During the winter session the hygiene department of the college consisted of one professor and one assistant professor continuously occupied with classes for six days in the week. Major Bradfield found in America the same arguments against improvement in medical education as are put forward in India: (1) few doctors would be produced while there are still large tracts without medical men; and (2) it would eliminate the poor student. It is true that in the Madras Presidency there are at present only 2013 registered medical practitioners, or 1 to every 23,000 of the population, while the city of Madras itself has 1 for every 1376 souls. American experience, however, is very relevant that, poorly trained or well trained, the doctor prefers to settle in town rather than in the sparsely populated area. Major Bradfield's report epitomises the need for quality rather than quantity in medical education, but unless the philanthropists of India come forward as those of America have done it is unlikely that funds will ever enable India to approach the high standard which is desirable. The readiest method immediately to hand of improving the standard of medical education lies apparently with the schools of tropical medicine.

The Medical College at Madras.

About five years ago the Madras Medical College authorities were compelled to restrict admissions in order to prevent difficulty arising in the matter of practical training when classes became too big and unwieldy. In order to prevent overcrowding, only students who for intermediate or B.A. examinations had taken for optional study one or other of the science subjects (chemistry, physics, zoology, or botany) were admitted. By an arrangement with the Madras University, the marks of candidates in these examinations were scrutinised by the Medical College authorities. This year, however, a selection board was set up to admit candidates, the idea being that the seats in the college available to male students should, as far as possible, be distributed on a communal basis. The members of the selection board were: Lieut.-Col. F. F. Elwes, I.M.S., Khan Bahadur Mahomed Osman Sahib, and Dr. C. Natesa Moodelliar. About 400 candidates sought admission, the number of seats available being only about 90. The board selected 20 from among the Brahmin candidates, the rest being made up of non-Brahmins, including Nairs, Indian Christians, Mahomedans, &c. In selecting candidates, it was also borne in mind to have all parts of the Presidency represented. There are no funds for building new educational institutions, and there is not sufficient academic machinery to turn out the necessary numbers of qualified men. At present the Presidency, with a population of over 47 millions, depends for its supply of medical graduates on one medical college and five medical schools, the latter being institutions for turning out sub-assistant surgeons. These medical schools do not all possess the equipment necessary for complete instruction; hence some students are compelled to finish their training at Madras. The accommodation available for male students at Madras Medical College is further curtailed by the necessity of finding room for the increasing numbers of women students seeking admission.

A New Medical College Required.

Another medical college is felt to be required, and Major-General G. G. Giffard, Surgeon-General with the Government of Madras, hopes before long to see one founded, either at Vizagapatam or in Madras itself. To place such a college at Vizagapatam would satisfy the Andhras, who have agitated for many years for an Andhra university, including first-rate medical and engineering colleges, at some suitable centre in their midst. There is already a medical school at Vizagapatam, the popularity of which is fast growing. Again, the establishment of a second medical college in Madras would be far less expensive; it would also be possible to impart a higher standard of training to the students in some subjects, notably midwifery. At present, pupils from the medical schools in the mofussil come to Madras for their midwifery course

on account of the difficulty of obtaining labour cases for demonstration in the up-country towns. Thus Madras has a strong claim from the point of view of efficiency. Moreover, a second medical college in the city would require no large investment in costly buildings. Government buildings are available at Royapuram, and any additional building that might be necessary could be carried out at comparatively small cost. The Royapuram Government Hospital, with 300 beds, and the Lying-in Hospital are well suited for holding demonstration classes. Additional laboratories would not be necessary for some time, as those in the present medical college could be made available by arranging for the students of both institutions to work in them in batches and at different hours. There are also the ophthalmic hospital and lunatic asylum at hand in the city. There should be no difficulty in finding a professorial staff among the medical men—Indian or European—already serving in Madras. The present Medical College does not draw all its professors from the Indian Medical Service, and the efficiency of the institution is not found to suffer on that account.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

A GROUP OF URBAN AREAS.

Carlisle.—The estimated population for 1921 was 53,200; birth-rate, 24·6; death-rate, 14·1; cancer death-rate, 0·99; pulmonary tuberculosis death-rate, 0·86; total tuberculosis rate, 1·27; infant mortality rate, 105·3. Dr. Joseph Beard's report shows that Carlisle, unlike most English towns, had an average rainfall of 29·83 inches during 1921. The infant mortality has gone up from 80 in 1920 to 105·3 in 1921, and the infant "diarrhœa" deaths from 12 to 29. Carlisle is exceptional also in showing no decline in the birth-rate after its rise in 1920. Dr. Beard is fairly optimistic as to the work of the V.D. clinic. He is of opinion that over 70 per cent. of all cases of venereal disease are either rendered non-infective or are cured; also that the greater attention given by midwives to prophylactic treatment is showing its effect in the lessened prevalence of ophthalmia neonatorum. He draws attention to the unsatisfactory feature that of the 766 births attended by midwives 1 child in 20 was weaned before the tenth day. Under housing, Dr. Beard tells us that, when the municipal scheme is completed, there will still be a large deficiency, and that this problem remains unsolved. The chief sanitary inspector also draws attention to the difficulty in getting repairs done owing to high costs, to the impossibility of emptying houses for complete renovation, and to the number of cases of indecent overcrowding.

Northampton.—Dr. J. Doig McCrindle's chief figures for 1921 are: Estimated population, 92,300; birth-rate, 20·4; death-rate, 10·4; infant mortality rate, 65·9; death-rate from pulmonary tuberculosis, 1·06; from other tuberculous diseases, 0·17. Unemployment became urgent early in the year, and reached considerable dimensions at its close. The danger of a water famine became critical in October, and was only averted by obtaining additional temporary supplies. Wells have been sunk in the gravel close to the River Nene, and the water thus obtained is being rendered safe by chlorination. Many of the closets in the town have no flushing cisterns, and have to be hand-flushed. Up to the end of 1921, 282 new houses had been built under the corporation's housing scheme, but these do not meet the need, and a considerable degree of overcrowding remains. The report of the tuberculosis officer, Dr. Stephen Rowland, gives particulars of the occupations of notified and fatal cases of pulmonary tuberculosis. During 1921, of 60 male deaths 24 were those of shoe operatives, while of 38 female deaths 8 were recorded from this trade. During the last 13 years pulmonary tuberculosis has caused the deaths of 465 male and 181 female shoe operatives. It is satisfactory to note that the pulmonary tuberculosis death-rate in Northampton, which in the quinquennium 1876–80 was 1·93, has steadily declined to 1·06 for each of the years 1920 and 1921. Dr. Emily H. Shaw reports with satisfaction the comparatively slight rise in diarrhœa, in spite of climatic conditions. Only one more infant died from diarrhœa in 1921 than in 1920. Dental treatment is now being provided for pregnant and nursing women, and children under 5 years of age.

Huddersfield.—The estimated population for 1921 was 116,776; birth-rate, 17·6; death-rate, 12·72; death-rate from all forms of tuberculosis, 0·91; cancer death-rate, 1·35. The infant mortality rate has risen from 80 in 1920 to 87 in 1921, there having been 15 deaths of infants from diarrhœa and enteritis in 1921, while none occurred in the previous year. Midwives were engaged for confinements in 1407 out of 2077 notified births, and sent for medical aid in 109 cases. The Huddersfield Corporation have a system of voluntary notification of pregnancy instead of an ante-natal clinic, and Dr. S. G. Moore reports that during 1921 the number of notifications received was 796, and that each case was visited and advised by an assistant medical officer of health. Two nurses are provided by the corporation to nurse sick babies under the supervision and direction of the family doctor. Three home-helps and two charwomen are also employed to help in the homes of maternity cases. Each case of ophthalmia neonatorum is visited forthwith by an assistant medical officer of health. There were nine such cases in 1921, and all recovered with vision unimpaired. Before the war the annual average number of new houses built was 320. During the five years preceding 1920 the average was 47. During 1921 the number of houses completed was 259, 178 by the corporation, and 81 by private enterprise.

Lincoln.—The estimated population for 1921 was 66,600; the birth-rate 22·2; the death-rate 11·3; the phthisis death-rate 0·77; the cancer death-rate 1·24; and the infant mortality rate 86·6. Dr. C. J. Coleman reports that unemployment has been especially bad in Lincoln, owing to the absence of Russian and other markets for agricultural machinery; this has thrown a great strain on the maternity and child welfare department, owing to the necessity for providing food and milk for nursing mothers and young children. Five cases of encephalitis lethargica were notified, three of which ended fatally. The cases occurred at different periods of the year and there appeared to be no connexion between them. Dr. Coleman issues a serious warning as to the danger from polluted wells in the district added to the city in 1920. The houses drain into leaky cesspools and the drinking water is drawn from wells on the same site. In some limited areas the ground is already sewage-logged. The overcrowding problem is not one of shortage of houses only. Owing to unemployment, artisans are remaining in houses too small for them, and there are cases of eight and ten people living in two-roomed cottages. 320 houses were completed during the year, 225 being part of the municipal housing scheme. There are, however, 20 houses vacant at the Swanpool Garden City, the rentals of which are 13s. per week, not including rates, and a few of the houses built by the Ministry of Munitions at St. Giles's are unoccupied. The gradual upward movement, which was expected on the completion of the municipal houses, has therefore not taken place and some of the smaller, cheaper houses continue to be dangerously overcrowded.

REPORTS OF SCHOOL MEDICAL OFFICERS.

Reading.—Dr. H. E. Milligan provides a useful summary of work done. 7161 children were examined out of 13,284 in the elementary schools. There were 14,322 attendances at the various clinics; 25 per cent. of those examined presented some defect requiring treatment and 61 per cent. of these were dealt with.

It is evident from the report of a well-managed town like Reading that the mechanical work of sanitary inspection has nearly reached its limit, and that the call for education in respect of bodily conditions is becoming urgent. Here, again, the use of Tuxford and Gleggs's tables of heights and weights as a standard sh ws how far these tables mislead and hinder. This standard gives the heights of boys of 12 as 139·8 cm., the average Reading child being 138·0 cm., but the Reading school boy being 148·7 cm. A difference in the averag· height of children of different social classes should not be accepted as appropriate or in vitable.

West Bromwich.—Owing to the inadequacy of the medical staff during the year 1921, it was found impossible to cope with the amount of routine work required by the Board of Education. Accordingly two age-groups instead of three were dealt with. Altogether 3327 children including 1285 special cases, were examined and 2938 were found to have defects. Dr. R. Woolsey Stocks reports a general improvement in the cleanliness of the children, and a marked deterioration during the latter part of the year in the condition of clothes and boots. Thi· latter occurrence he attributes to the increase of unemployment. The number of skin defects was high, and the school medical officer, Dr. H. Ashkenny, suggests that the systematic provision of soap and towels in the school, besides having an educational value, would minimise the difficulties under this heading. From investigation made into the prevalence of goitre among 4277 school-children up to 14 years of age, 75 girls and 21 boys were found to show evidence of this condition. Only one boy came under grade 4, which indicates considerable enlargement, and none under grade 5, where the growth is even more marked. Eight girls came under grade 4, and two under grade 5. Two-thirds of the patients were between 12 and 14 years of age. During the year 1098 children were fed by th· Education Committee. Here breakfast, consisting of cocoa made with ½ gill of milk per head and bread with margarine, jam, or lard, is the only meal supplied. Occasionally dripping may be substituted for margarine when the prices are comparable. The above dietary has been in use since 1909.

Sheffield.—During the past year 24,505 children underwent routine inspection, 20·9 per cent. of these required treatment for one or more defects, and, in addition, 4 55 special cases were seen. Only three definite and 43 suspected cases of pulmonary tuberculosis were found. There were 2118 cases of defective vision and 797 of defective hearing. Of 5140 children requiring treatment 4145 received it. The secondary school work, too, has now been established on sound lines, 91 per cent. of those requiring treatment receiving it. Dr. Thomas Chetwood feels that the most pressing need is the provision of adequate premises for a central clinic, and rightly says that an overcrowded clinic is an inefficient clinic. "The hope that preventive measures will eventually lessen the need for curative work is, unfortunately, deferred still further by the same adverse circumstances which are hampering progress in every other direction." The premises in Hawley-street have long been inadequate for the purpose. It is not worthy that special provision has been made for medical inspection in the six newest schools. The development of the inspection clinic idea in Sheffield appears a great addition to efficiency in that the routine work is done in the school and all who require more detailed consideration are referred not only by doctors but by teachers and school attendance officers to the inspection clinic. Children requiring special medical certificates for employment and child theatrical performers are also examined there. There were 20,200 attendances of 8401 children during 1921, including 18 definite and 225 suspected cases of pulmonary tuberculosis, 125 cases of tuberculosis of the spine, hip, or other bones and joints, 267 cases of rickets, and 135 cases of infantile paralysis. The "open air" school report contains a table giving average increase in height and weight—a perfectly meaningless figure when no ages are stated. Similarly the elementary and the secondary school-children are judged, the one as being below and the other above the same anthropometric standard. The installation in four schools of shower baths accommodating 20 children simultaneously will do more to associate the idea of cleanliness with regular bathing in the coming generation than all the nurse's inspections. The experiment of efficiency tests in playground sports as carried out at Nort·n Lees School is worthy of extension, setting up as it does an individual idea of physical capacity. The report shows careful work and the intelligent conception of school hygiene usually associated with this city.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. T. T. Jeans is placed on the retired list with the rank of Surg. Rear-Admiral.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. A. J. MacDougall retires on retd. pay and is granted the rank of Col.

Capt. H. A. Crouch retires, receiving a gratuity.

ARMY RESERVE OF OFFICERS.

Lt.-Col. A. F. Heaton, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY.

Maj. F. Coleman resigns his commn. and retains the rank of Maj.

Capt. G. B. Holroyde, R.A.M.C., to be Adjt., 56th (1st London) Div., R.A.M.C., T.A.

Capt. W. J. Purves, having attained the age limit, is retired and is granted the rank of Maj.

Capt. W. E. A. Buchanan (late R.A.M.C.) to be Capt.

P. Lloyd-Williams (late Surg. Lt., R.N.) to be Lt.

The undermentioned offrs., having attained the age limit, are retired and retain their rank, except where otherwise stated: Majs. W. S. Kerr (granted the rank of Lt.-Col.) and F. J. Green. Capts. H. B. Sproat (granted the rank of Maj.), H. Lee, E. B. H. Hughes, V. Bateson, M. B. G. Sinnette, and E. S. G. Fowler.

The undermentioned officers resign their commns. and retain their rank, except where otherwise stated: Capts. W. R. Pierce, G. Stevenson, B. M. Footner, and K. A. P. R. Murray (are granted the rank of Maj.), A. V. Glendinning, G. L. Wilkinson, R. B. M. Yates, D. Buchanan, R. A. Hooper, and E. A. Williams.

The following Captains relinquish their commissions: L. M. V. Mitchell (granted the rank of Maj.) and R. Findlay (retains his rank).

TERRITORIAL ARMY RESERVE.

Majs. A. R. Muir and W. A. L. Holland, from Gen. List, to be Majs.

Capt. W. S. Forbes, from General List, to be Capt.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL: COUNTRY BRANCH.—This hospital acquired last year the Mary Wardell Convalescent Home situated at Brockley Hill, Stanmore, and is carrying it on as a branch institution with complete treatment, including operation where necessary. Many orthopædic cases receive benefit from "sun cure," and the new hospital, situated as it is on the top of a hill about half a mile south of Elstree, is well adapted for this purpose. Already there are about 40 patients undergoing treatment and this number will be increased in the near future. With the object of making the institution better known, the Earl of Denbigh, who is the chairman, and the committee of the hospital, will hold a reception at Brockley Hill on Sept. 21st, at 3 P.M., when tea will be provided.

ROYAL SUSSEX COUNTY HOSPITAL.—The decision of the governors of the Royal Sussex County Hospital at Brighton to close down 125 beds on Oct. 1st, owing to the difficulty in raising funds, is unpopular in Sussex. Urgent appeals for the largest hospital in the whole of the south of England have, however, received only meagre response. Year after year at the annual meeting of the Royal Sussex County Hospital a note of warning has been sounded that without sufficient funds some change of policy would have to be pursued in the conduct of the institution. The position is no new one. Some £13,000 are needed to carry on this year. It is hoped that local supporters will now realise the importance of increasing their subscriptions and of taking steps to improve the financial position of their hospital.

Correspondence.

"Audi alteram partem."

THE CAUSAL RELATION OF ALCOHOLISM TO INSANITY.

To the Editor of THE LANCET.

SIR,—In view of the frequent repetition, even in quite reputable text-books of psychological medicine, of the statement that alcohol is one of the chief factors in the causation of mental disease, it may be of interest to call attention to the statistics of insanity in this country during the recent period of decreased alcoholism. The accompanying table shows, for the years 1913 to 1918, the number of first admissions to asylums in comparison with the movement of drunkenness and of other manifestations of alcoholic excess. To avoid the obvious risk of fallacy arising from the absence of large numbers of the adult male population on military service, the figures refer to women only.

Alcoholism and Insanity (Women only), England and Wales, 1913–18.

Year.	Convictions for drunkenness.	Deaths from		Attempted suicide.	First admission to lunatic asylum.
		Alcoholism.	Cirrhosis of liver.		
1913	35,765	719	1665	988	9372
1914	37,311	680	1773	1049	9702
1915	33,211	584	1525	816	9078
1916	21,245	333	1163	436	8850
1917	12,307	222	808	452	8702
1918	7,222	74	579	400	9726

The fact that, despite a reduction of alcoholism amounting to about 80 per cent., there has been no decline, but, if anything, a slight upward tendency in the incidence of insanity, would be difficult to understand if it were true, as asserted by some writers on the subject, that "alcohol stands in the first rank as a factor in the production of insanity." It has already been shown conclusively by Sir Frederick Mott that the belief in the predominantly alcoholic ætiology of mental disease is a myth evolved by the application to unreliable data of a very crude process of inference from antecedence to causation, and these figures give further evidence of the soundness of his criticism.

The point is of more than merely theoretical interest at the present time, because, since alcoholism is often regarded as differing from other deleterious agencies by being in some sort a manifestation of wilful vice, it may happen that an insane person, whose insanity is erroneously imputed to alcoholic excess, will on that account be debarred from financial relief to which he might otherwise be entitled. There is, therefore, some need to emphasise the fact that, when insanity is really due to alcoholism, it bears characteristic clinical marks of its origin, and that, in the absence of such marks, a history, even if authentic, of antecedent drinking in a case of paranoia, or dementia præcox, or any other psychosis, gives no sort of ground for assuming that alcohol had anything to do with the causation of the disease.

I am, Sir, yours faithfully,

W. C. SULLIVAN, M.D.,
Medical Superintendent, Broadmoor State Asylum.

Sept. 14th, 1922.

DYSPITUITARISM, OBESITY, AND INFANTILISM.

To the Editor of THE LANCET.

SIR,—I am sure all will agree with the editorial remarks in your issue of Sept. 16th (p. 625) concerning the interest and value of Dr. Letheby Tidy's critical review of certain aspects of our knowledge of the pituitary body. Perhaps, however, I may be allowed to call attention to one or two points of experimental and clinical importance which are not made quite clear, and to a suggestion that should be capable of confirmation or the reverse.

First, with regard to the experimental production of dystrophia adiposogenitalis, although the conflicting testimony as to the lesion necessary for the evolution of this syndrome is quite accurately discussed, and what I, personally, was unable to confirm is stated, my positive experiments have escaped notice. I found that dystrophia adiposogenitalis could only be caused by injury to the stalk—that is to say, when the stalk of the pituitary was divided or simply compressed with fine artery forceps the condition under discussion developed.[1] Obviously the blood-supply, which for the most part passes down the stalk, is seriously impaired by such procedures. Clinically, in this connexion it is interesting that suprasellar lesions, unconnected with the pituitary and which in no way distort the sella turcica, by pressure on the stalk may produce all the symptoms—except the ocular—associated with enlargement of the pituitary and deficient secretion. If ocular symptoms be present in any case of this kind, they are due, of course, to the suprasellar lesion, for the pituitary is compressed rather than enlarged in these circumstances. Such cases are often missed as a radiograph shows the sella turcica to be of normal size.

Secondly, I have long wondered whether the drowsiness present in encephalitis lethargica may not be due to compression of the infundibular stalk by the congested dura mater through a small aperture in which this process passes. I have often mentioned this supposition to those who have the opportunity of making post-mortem examinations, but I do not think the point has been elucidated.

I am, Sir, yours faithfully,

Liverpool, Sept. 16th, 1922. W. BLAIR BELL.

THE SCOPE OF VACCINE THERAPY.

To the Editor of THE LANCET.

SIR,—I advocate eight injections because I find that the best results are obtained from a course of that length. I am not concerned to argue whether seven, eight, or nine doses are the most advantageous, for as Dr. A. K. Gordon remarks in your issue of Sept. 16th (p. 640), much depends upon the individual patient. But I had in mind such treatment as the administration of a vaccine continuously for two years. I have encountered this on more than one occasion, and I imagine that Dr. Gordon will agree that the best advice one can give in such circumstances is to allow the patient a rest and an opportunity to recover from the treatment. I note with much interest that Dr. Gordon believes in small doses, and that most of the improvement occurs in the latter half of the course. It is not an unfair inference that the improvement coincides with the period when the dosage becomes of appreciable magnitude, and I therefore suspect that there is small difference between his 16 doses and my eight. I also have had many cases sent to me which have not benefited by other vaccines, but my experience is precisely opposite to that of Dr. Gordon—it is the "old style" vaccine that has been found wanting. And I may add that it is not often that the residual (otherwise detoxicated) type fails to work a considerable change for the better.

But I do not think it fair to compare an autogenous vaccine with a detoxicated stock vaccine, as Dr. Gordon does. His success with gonococcal infections after the detoxicated vaccine has failed is interesting, but I fear that general opinion is against him. I have made a point of inquiring from clinicians in charge of V.D. centres as to the results obtained with residual vaccines prepared by myself and with detoxicated vaccines prepared under the direction of Dr. David Thomson. The general type of vaccine is the same, and the results are identical. I found that opinion is practically unanimous that they are of the greatest service in the treatment of gonorrhœa.

I am, Sir, yours faithfully,

Manchester, Sept. 16th, 1922. C. E. JENKINS.

[1] Quart. Journ. Exper. Physiol., 1917, xi., 77.

RHINO-LARYNGOLOGY.

To the Editor of THE LANCET.

SIR,—In his most interesting account of Transatlantic Development of Rhino-Laryngology in your issue of July 22nd, Prof. H. S. Birkett might have made a more detailed reference to the treatment of Highmore's antrum. About 30 years ago this occupied the attention of American authorities considerably, in the main as to the approach to the antrum. At the time (THE LANCET, July 22nd, 1892, and April 29th, 1893) I strongly advocated the opening in the canine fossa and did this principally on account of the fact that no opening ought to be made into the antrum which does not offer facilities for inspecting the antrum with a good light. I opened the antrum with a circular trephine and then enlarged the opening with cutting forceps. I instanced the great need of such a procedure in ozæna and recurrent nasal polypi. In the case of the former the antrum is found greatly affected. Its mucous membrane is seen to be covered with a white pultaceous deposit and some evil-smelling discharge is present. In recurrent nasal polypi, polypoid degeneration of the antral mucosa is invariably detected.

To open the antrum from the nose is manifestly as inadequate as it is unwise. To drain a cavity containing products, it may be, of such potential danger to a respiratory passage is surely not a surgical procedure to be commended. Beyond that, the antrum cannot be examined from such an approach.

I am, Sir, yours faithfully,
W. R. ROBERTSON, M.D.

Point Villa, Mossel Bay, S. Africa, August 24th, 1922.

DEATH IN THE ALPS.

To the Editor of THE LANCET.

SIR,—The idea, mentioned by Dr. E. W. Scripture in your issue of Sept. 16th, that a good many accidents are due to unconscious suicidal tendencies was first propounded by Freud and will be endorsed by every practising psycho-analyst. May I be permitted to quote in corroboration a case of a lady who is *not* a neurotic, but quite a healthy normal person. Whilst climbing a mountain with a party the lady uttered the strange thought that she would like to throw herself down the mountain. "It would be so fascinating to do so." On being asked wherein the fascination lay, she said she would like to experience what it feels like to fall from terrace to terrace, bumping against projecting stones and trees. Her vision was of having her head "cut open" and seeing it bleeding (but only her head). Incidentally she also mentioned another phantasy of hers of being run over by a motor-car, adding "it must be a big heavy one with fat well-inflated tyres." The car would have to go over her while she was lying stretched out flat with her back on the ground. Though only a superficial analysis was attempted, the associations proved that being run over was a sadistic phantasy of sexual intercourse, the tyres being a distinct phallic symbol. The cutting open of the head had the same significance. It may be mentioned that such sadistic unconscious phantasies are to be met with quite commonly among young children.—I am, Sir, yours faithfully,

S. HERBERT, M.D., M.R.C.S., L.R.C.P.

Manchester, Sept. 16th, 1922.

THE HEART AS A POWER-CHAMBER.

To the Editor of THE LANCET.

SIR,—Will you allow me to comment upon one or two points raised in the kindly little notice of my book in THE LANCET of Sept. 9th? You say: "The importance of auricular systole in mitral stenosis also receives special consideration." I was not aware that I had dwelt upon this, for I should regard it as self-evident, my desire being rather to lay stress on the *relative un*importance of the auricular systole in health, and the *relative un*importance of its absence in not a few cases of cardiac disease. The general drift of my auricular argument might thus, through the above quoted words, be open to misconception. With reference to one other point—namely, the position of the *v* wave in the cardiac cycle, you state that certain criticisms of mine are based upon "what appears to be a false hypothesis." It is here that I should have welcomed a little more discussion, and demonstration of my fallacy, if the exigencies of space had permitted.

I am, Sir, yours faithfully,
HARRINGTON SAINSBURY.

Wimpole-street, W., Sept. 9th, 1922.

*** Dr. Sainsbury suggests that the *v* wave is probably due to an impact occurring at the very commencement of ventricular systole. He goes on to point out that a venous wave produced in this way would precede the carotid pulse, and that one would therefore expect the order of the waves in the jugular tracing to be *a*, *v*, *c*, instead of *a*, *c*, *v*. If, however, the more generally accepted hypothesis is adopted—namely, that the *v* wave is due to stasis—then the factors which produce it will operate not at the commencement but during the later part of ventricular systole, and the *v* wave will occur later in the cardiac cycle.—ED. L.

PERCENTAGE COMPARISONS.

To the Editor of THE LANCET.

SIR,—I think the final sentence of your review (THE LANCET, Sept. 16th, p. 636) of my report on the School Medical Service in this borough is an unfair comment, possibly due to a failure to appreciate the reason for the inclusion of the tables on verminous, &c. conditions found in the schools. These tables are only of local interest, so that head teachers may know the relative condition, with regard to cleanliness, of the children in attendance at the various schools in the town. The number of such children varies from 27 to 394, and, if actual figures instead of percentages were inserted in the tables, it would be impossible for a person interested in a particular school to appreciate at a glance how that school compared with the town as a whole, or with any other school.

I am, Sir, yours faithfully,
J. E. SPENCE,
Medical Officer of Health, Eccles, Lancashire.

Sept. 18th, 1922.

*** We agree with Dr. Spence that a common denominator is useful to help head teachers make a comparison justified by the numerator. Our point was that a numerator of one does not justify any comparison.—ED. L.

SANATORIUM BENEFIT.

To the Editor of THE LANCET.

SIR,—Dr. J. D. Macfie has done well to call attention (THE LANCET, Sept. 9th, p. 586) once more to the whole subject of the modern treatment of tuberculosis, and his seven queries cover the ground fairly completely. Tuberculosis officers with wide clinical experience who have been actively engaged in the anti-tuberculosis campaign both before and after its official institution must, obviously, be in a position to review the whole situation, to see the weak points in the scheme and, it may be, to suggest modifications therein. Assuming that a measure of success even has been scored by sanatorium treatment rightly applied—and we have it upon the authority of Sir George Newman that the principle is right at bottom—we are, I maintain, fully justified in utilising this unit in the scheme to the utmost possibility, consistent, of course, with economy.

With Dr. Macfie's answer to his second question, "Has notification been a blessing?" most will, I think, be in agreement. As carried out at the present time, the procedure is almost a farce. It is not always the general practitioner's fault that cases are not notified sooner. In a large percentage of cases

the patient himself is directly responsible. He may be wholly ignorant of the true nature of his malady, or he may have a shrewd suspicion, but, so long as he is able to carry on at work, he will not seek medical advice. He does not want the fact blazed abroad that he is a real or a potential consumptive, as he imagines it will be. He keenly resents, and naturally so, being made a social pariah and his wife and family outcasts. Little did the profession think, when it adopted the "infection theory" of pulmonary tuberculosis, that notification would inevitably defeat its own ends by deliberately encouraging patients to hide the disease as long as possible and medical men to refrain from "labelling" them as tuberculous. The persecution of lepers in the Middle Ages was hardly less rigorous than the hunting about of the unfortunate consumptive as carried on at the present day, and no one will deny that the danger of exaggerating the influence of infection in promoting "the foolish and unjustifiable phthisiophobia from which the public is suffering to-day," as Dr. C. L. Minor has pointed out, is a grave one. But the mischief has already been done, with the result that there now exists a new "conspiracy of silence" on the part of the patient, the doctor, and the public to conceal the beginnings of the disease. Unfortunately, this is the worst thing that could have happened from the point of view of prevention and also of treatment. Nor will this state of affairs be remedied by enforcing penalties for omission to notify a case. There would still remain those who would be suffering from tuberculosis unknown to themselves, or known but unattended medically for the reason given above.

In my opinion the detection of the first beginnings of disease, the supreme importance of which is just being realised by the profession, would be best accomplished (1) by the thorough and systematic examination of contacts, which is already being done, though insufficiently, and (2) by a regular and systematic medical examination of the whole population, each practitioner being responsible for a certain number of persons per annum. But for this work special training in the methods of early diagnosis would be necessary for every examiner.—I am, Sir, yours faithfully,

G. NORMAN MEACHEN, M.D., M.R.C.P.

Southend-on-Sea, Sept. 14th, 1922.

Medical News.

SOCIETY FOR THE STUDY OF INEBRIETY.—A meeting will be held in the rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, W., on Tuesday, Oct. 10th, at 4 P.M., when Colonel L. W. Harrison will open a discussion on the Relation of Alcoholism to Venereal Disease.

CHARING CROSS HOSPITAL MEDICAL SCHOOL.—The winter session will be opened by the annual prize distribution which will take place in the out-patients' hall of the hospital on Tuesday, Oct. 3rd, at 3.30 P.M., Lord Burnham will distribute the prizes and will also preside at the annual dinner of past and present students to be held at the Imperial Restaurant (Oddineno's), Regent-street, London, W., the same evening, 7 for 7.30 P.M. Tickets (12*s.* 6*d.* each) can be obtained from the hon. secretary to the dinner, Mr. Frank Noakes, at the medical school.

RED CROSS FLAG DAY.—The Prince of Wales has written to the organising committee responsible for the Flag Day on Oct. 6th, which is to be held on behalf of the Joint Council of the Order of St. John and the British Red Cross Society and the combined hospitals of London, expressing his desire that many more voluntary workers will enrol at 19, Berkeley-street, London, W., or any of the hospitals, as flag-sellers. The response from the citizens of London to the current appeal for £500,000 by the end of the year has so far brought in nearly £320,000, and he confidently expects that the results of the Flag Day will materially aid in carrying the aggregate result into the last £100,000.

NORTH-EAST LONDON POST-GRADUATE COLLEGE.—The autumn special course is to be held at the Prince of Wales's General Hospital, Tottenham, N. 15, from Oct. 16th to 28th. As on former occasions it will include in the mornings, from 10.30 A.M. to 12.45 P.M., practical demonstrations of clinical methods applicable in medical practice, the exhibition of illustrative cases, &c., and in the afternoons, from 2 P.M. to 5.30 P.M., demonstrations of groups of selected cases, clinics in the various general and special departments, and clinical lectures. On Saturdays demonstrations will be given in adjacent special hospitals. Luncheon will be obtainable in the neighbourhood of the hospital and tea will be provided each afternoon. A syllabus of the course and any further information desired may be had on application to the Dean.

ST. MARYLEBONE GENERAL DISPENSARY.—A post-graduate course of 12 lectures on the management and feeding of infants and young children will be given by Dr. Eric Pritchard to qualified practitioners on Mondays and Thursdays, at 6 P.M., beginning on Oct. 5th, at the St. Marylebone General Dispensary, 77, Welbeck-street, London, W. 1. Those taking the course will be entitled to attend the infant consultations held by Dr. Pritchard on Tuesdays and Fridays, at 2 P.M., at the Infants Hospital, Westminster, and on Tuesdays at 11 A.M., and Thursdays at 3 P.M., at the Dispensary. Visits will also be paid to the Nursery Training School, 3, Wellgarth-road, Golders Green. For further information and tickets for the course (two guineas) application should be made to the Secretary at the Dispensary.

HARVEIAN SOCIETY.—The winter session of this Society will open with a clinical meeting to be held at Paddington Green Children's Hospital, on Thursday, Oct. 5th, at 4.30 P.M.

DONATIONS AND BEQUESTS.—The late Miss Susan Fisher Scott, of Manchester, left £100 each to the Manchester and Salford Blind Aid Society, to the Metropolitan Association for Befriending Young Servants, and the Governess Institution and Home, Manchester; and £50 each to the Manchester Eye Hospital and the Ladies' Public Health Society.

WEST CORNWALL INFIRMARY, PENZANCE.—On Sept. 5th a new X ray room was formally opened at this infirmary, through the generosity of Mrs. H. Grylls and her son, in memory of her sister, Sarah Bedford. The governors will immediately proceed with the installation of new apparatus at a cost of £300, and much benefit is expected from the increased efficiency of the X ray work done at the hospital.

YORKSHIRE TUBERCULOSIS SOCIETY.—This society has just issued the programme of its ensuing winter session. Meetings are held at 4 P.M. on the last Saturday of each month except December, beginning in September with a lecture-demonstration at Rivelin Valley Hospital, Sheffield, by Dr. C. L. Pattison, and ending in April, when Mr. Garrick Wilson, F.R.C.S., gives a paper on orthopædics in relation to tuberculosis, at the County Hall, Wakefield. The society is now affiliated to the Tuberculosis Society of Great Britain (hon. sec., Dr. F. J. C. Blackmore, 138, Herbert-road, Plumstead, London, S.E.) and the new chairman is Dr. J. Rennie, chief clinical tuberculosis officer of Sheffield.

NAVAL MEDICAL WAR MEMORIAL.—The memorial tablet designed for the Royal Naval Hospital at Plymouth, commemorating the names of those naval medical officers and members of the nursing staff who lost their lives in the war, will be unveiled on Wednesday, Oct. 4th, at 3 P.M. As already announced in these columns a tablet was unveiled at the Royal Naval Hospital, Haslar, on August 17th. A similar tablet will be erected at the Royal Naval Hospital, Chatham, at a later date. The relatives and friends of the fallen, and all others who may be interested, are invited to attend the unveiling ceremony at the Royal Naval Hospital, Plymouth, or at Chatham, whichever may be most convenient for them.

MANSON MEMORIAL MEDAL.—The first presentation of the medal struck in memory of Sir Patrick Manson, from funds collected by the Manson Memorial Fund under the chairmanship of Sir William Leishman, will be made to Lady Manson on Tuesday, Sept. 26th, at 5.15 P.M., at the London School of Tropical Medicine. This medal, which bears on the obverse a very fine profile of Sir Patrick Manson, is in bronze, and the special medal to be presented to Lady Manson bears on the obverse the words, "London School of Tropical Medicine." In future a similar medal, but bearing a device "Tropical Medicine and Hygiene" on the reverse, will be presented triennially to any specially distinguished worker in tropical medicine; the recipient to be selected by the Council of the Royal Society of Tropical Medicine and Hygiene.

Dr. Urban Pritchard, emeritus professor of aural surgery at King's College, London, celebrated his golden wedding on Sept. 19th.

IRISH MEDICAL ASSOCIATION.—In consequence of the disturbed condition of the country, the Irish Medical Association has failed to hold its annual meeting this summer. The gathering is usually held in June, but in view of the general election taking place at that time the meeting was fixed for the middle of July. It was then, however, impossible to communicate with members, owing to the disturbance of railway traffic. The meeting, therefore, fell through, but summonses were issued for the first week of September. A few members attended, but it was not possible to obtain a quorum, and an adjournment for a week gave no better result. The meeting now stands indefinitely adjourned.

MEDICAL APPOINTMENT AT THE DUBLIN UNION.—We learn from an Irish correspondent that a medical appointment made last week at the Dublin Union is likely to give rise to friction in that it has been made on terms at variance with an agreement arrived at a year ago between the guardians and the medical staff. For some years prior to 1921 the resident medical officers of the Union were appointed for a term of three years, with salaries for the successive years of £150, £165, and £180, apartments, fuel, and light being provided, together with £1 a week in lieu of first-class rations. It was recognised that with the depreciated value of money £1 a week was no equivalent of the first-class rations formerly provided. After much discussion an agreement was reached in 1921. The guardians offered to compound salary and ration allowance into a fixed remuneration of six guineas a week, and this offer was accepted by the medical staff. The agreement was submitted to the Local Government Department for approval, but up to the present, although more than a year has elapsed, the department has given no decision. When a vacancy recently occurred the guardians advertised the post, not on the terms agreed a year ago, but on the old terms of £150 a year, with £1 a week ration allowance. Several candidates applied, but on being informed of the facts all but two withdrew their candidature, and sent to the guardians a joint statement of their reasons. In the event, one of the two candidates who persisted in their candidature was elected, and this lady assured the guardians that in her opinion the remuneration offered was adequate. At the same time she stated that she was not a member of any medical association. The action of the guardians in proceeding to make an appointment on terms differing from those to which they had bound themselves appears unjustifiable, while the dilatoriness of the Local Government Department admits of no excuse. The action of the lady elected in taking advantage of the abstention of the other candidates to secure an appointment under such conditions is not likely to recommend her to the profession. Her appointment is not complete until sanctioned by the Local Government Department, and it is hoped that that body will, first, sanction the agreement of 1921; and, secondly, order a new election in accordance with the terms of that agreement.

Appointments.

ARNOTT, T. F., M.B., Ch.B. Glasg., has been appointed House Physician, Royal Devon and Exeter Hospital.

GILFILLAN, J. A., M.D. Glasg., D.P.M. Lond., Second Assistant Medical Officer, City Mental Hospital, Humberstone, Leicester.

GRACE, W. H., M.D. Lond., D.P.H., Honorary Assistant Physician and Honorary Pathologist in charge of the John Elliott Memorial Laboratory, Chester Royal Infirmary, and Pathologist to the County Mental Hospital, Upton, Chester.

INNES, J. W., M.B. Aberd., D.P.H., Assistant Medical Officer of Health and Assistant Tuberculosis Officer for Grimsby.

MCRAE, R. T., M.R.C.S., Assistant Physician, Murray Royal Asylum, Perth.

Vacancies.

For further information refer to the advertisement columns.

Aberystwyth Infirmary and Cardiganshire General Hospital.—H.S. £250.

Birmingham General Hospital.—Two H.S.'s. £95 and £70 respectively.

Cardiff, King Edward VII. Hospital.—Two H.S.'s. £150.

Chester Royal Infirmary.—Asst. H.S. £150.

City of London Hospital for Diseases of Chest, Victoria Park, E.—H.P. £125.

County Council of Middlesex.—Dental Officer. £400.

Dreadnought Hospital, Greenwich.—H.S. £150.

Gateshead Mental Hospital, Stannington, Newcastle-on-Tyne.—Asst. M.O. £400.

Hospital for Sick Children, Great Ormond-street, W.C.—H.S. and H.P. Each £50.

Hospital of St. John and St. Elizabeth, 40, Grove End-road, N.W.—Bacteriologist and Pathologist. 50 guineas.

Hull Royal Infirmary.—Asst. H.S. £150.

Isle of Wight County Council.—County M.O. £1000.

Lucknow University, India.—Prof. of Ophthal. Rs. 1200 a month.

Manchester Northern Hospital for Women and Children.—Anæsth.

Manchester, St. Mary's Hospitals for Women and Children.—H.S. £100.

Manchester, Salford Royal Hospital.—Res. S.O. £250. H.P. £200. Two H.S.'s and Cas. H.S. Each £150.

Newcastle-upon-Tyne City Hospital for Infectious Diseases.—Res. M. Asst. £350.

Oswestry, Shropshire, Orthopædic Hospital.—H.S. £250.

Oxford, Radcliffe Infirmary and County Hospital.—Anæsth. £100, and Hon. Asst. P.

Prince of Wales's General Hospital, Tottenham, N.—H.P. and H.S. Each £200. Jun. H.S. and Jun. H.P. Each £120.

Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—H.S. and Cas. H.S. Each £100.

Queen Mary's Hospital for the East End, Stratford, E.—Res. M.O. £300. Cas. O. £150.

Richmond Royal Hospital, Surrey.—H.S. £150.

Rochester, St. Bartholomew's Hospital.—Res. H.S. £250.

Royal Free Hospital, Gray's Inn-road, W.C.—Asst. Anæsth. £100. Asst. S. to Ear, Nose, &c. Dept. Cas. O. £100.

St. Bartholomew's Hospital.—Two Jun. Res. Anæsths. Each £80.

St. Bartholomew's Hospital Medical College.—Dem. of Mid.

St. George's Hospital, S.W.—Radiologist. £100.

Sheffield Royal Hospital.—Asst. Cas. O. £150.

Sheffield University.—Dem. in Path. and Bact.

South London Hospital for Women, Clapham Common, S.W.—Temp. Asst. P.

South Mimms, Barnet, Clare Hall Sanatorium.—Asst. M.O. £350.

Stockton Union.—Med. O. and Pub. Vac. £650.

Sunderland Royal Infirmary.—H.P. and H.S. Each £200.

Sunderland Union Institution and Cottage Homes.—Head M.O. £600. Also Res. Asst. M.O. £200.

Swansea County Borough.—Female Asst. M.O. £500.

West End Hospital for Nervous Diseases, 73, Welbeck-street.—Hon. Clin. Assts.

Whipps Cross Hospital, Whipps Cross-road, Leytonstone, E.—Deputy Med. Sup. £600.

The Chief Inspector of Factories, Home Office, S.W., announces the following vacant appointment: Bishop Auckland (Durham).

Births, Marriages, and Deaths.

BIRTHS.

DERHAM-REID.—On Sept. 13th, at Auchinellan, St. Helens-road, Bolton, the wife of James Derham-Reid, M.C., L.R.C.P. Lond., M.R.C.S. Eng., of a son.

GROVE WHITE.—On Sept. 15th, at Gledhow-gardens, S.W. 5, the wife of J. H. Grove White, M.D., Captain, I.M.S. (retired), of a daughter.

TAYLOR.—On Sept. 12th, at Horsforth-avenue, Bridlington, the wife of C. R. Taylor, O.B.E., M.D. Cantab., of a daughter.

MARRIAGES.

BOURDILLON—REISS.—On Sept. 9th, at Lambeth Parish Church, Captain and Brevet Major Lancelot G. Bourdillon, D.S.O., M.C., R.A.M.C., to Sylvia Caroline, daughter of the late Charles A. Reiss and of Mrs. Reiss, Hill House, Streatley, and Coleherne Court, S.W.

BROWNE—MOORE.—On Sept. 16th, at St. John's, Westminster, Major Barwick S. Browne, R.G.A., to Enid M. Moore, L.R.C.P., M.R.C.S., only daughter of Mr. (and the late Mrs.) Skinner Moore.

DIVER—MAY.—On Sept. 12th, at St. John the Baptist Church, Bognor, Ebenezer William Diver, M.D., to Helen Gertrude, widow of Walter John May, of Longstone, Barnstaple, Devon.

DEATHS.

FORSYTH.—On June 28th, at Singapore, of septicæmia nephritis, John Maitland Forsyth, M.B., Ch.B.

FOX.—On Sept. 16th, at his residence, "The Quarry," Ilfracombe, Cornelius Benjamin Fox, M.D., F.R.C.P.

HILL.—On Sept. 8th, at Inglenook, Hurst-road, Horsham, John Hill, M.R.C.S., late of Milan, aged 66.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

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WAR WASTAGE FROM MINOR AILMENTS.*

BY A. BERTRAM SOLTAU, C.M.G., C.B.E.,
M.D. LOND., F.R.C.S. ENG.,
COLONEL, A.M.S., T.F.

EACH campaign brings its own special problems and difficulties for the Medical Service, and lessons drawn from one will not of necessity apply to another. South Africa taught lessons which dominated us at the commencement of the recent war, where conditions were totally different. There is no need to quote to students of military history the statistics of illness in past wars, and the predominating influence exercised by disease, as compared with battle casualties, on the strength of an army. That illness was so largely held in check in this war is a well-recognised fact, and a source of justifiable pride to the Army Medical Service.

The Proportions of Sick and Wounded.

During the whole of the war in France the number of cases transferred from the front to the bases reached a grand total of 3,519,913. Of these only a little over half were cases of sickness, as the following figures show:—

1917.	Sick ..	543,002	*1918.*	Sick ..	585,818
	Wounded	506,103		Wounded	569,616
	Total ..	1,049,105		Total ..	1,155,434

These statistics refer to serious cases requiring evacuation to the bases. Admissions generally to medical units, including all grades of severity, showed a proportion of 374 wounded to 626 sick, or about 1 to 1·7, a very remarkable achievement. A medical service cannot control wastage from wounds, though by efficient treatment the period of recovery can be materially shortened. It can, however, largely prevent disease, and also reduce the time of convalescence. The large measure of success in these directions which was attained in France should be an incentive to still greater effort in the future. On the Western front we experienced no widespread epidemic until the outbreak of influenza in 1918, and very little fatal illness, for the death-rate amongst cases admitted to hospital for disease was only 6 per 1000.

The growing demands on our man-power led to an investigation during 1917 as to the causes of sickness in the army. The following figures resulted from this investigation, and though they have already been published[1] I quote them because I think helpful deductions can be drawn from them.

Analyses of Sick Admissions for One Year.

	A.			B.	
Scabies	.. .. ..	10,736	P.U.O.	.. ..	15,392
I.C.T.	.. .. ..	10,284	Trench fever	..	5,244
Skin diseases	.. ..	4,534	Myalgia	.. ..	4,755
Boils	.. .. ..	1,325	Rheumatism	.. ..	633
		26,879			26,024
	C.			D.	
Debility	.. ..	2,535	Diarrhœa	.. ..	3,913
Cardiac	.. ..	2,587	Dysentery	.. ..	1,821
			Gastro-enteritis	..	599
		5,122			6,333
	E.			F.	
Influenza	.. ..	3,627	Eye	.. .. ..	1,073
Bronchitis	.. ..	3,461	Ear	.. .. ..	1,408
Pneumonia	.. ..	751	Hernia	.. .. ..	1,305
Pleurisy	.. ..	635	Piles	.. .. ..	1,349
Tubercle	.. ..	258	Varicose veins	..	97
Laryngitis	.. ..	431	Dental	.. ..	2,606
Tonsillitis	.. ..	1,422	Appendix	.. ..	698
		10,585			8,536
	G.			H.	
Measles	.. ..	785	Neurasthenia	..	381
Mumps	.. ..	446	N.Y.D.N.	.. ..	3,296
Diphtheria	.. ..	38			3,677
		1,269			
Local injuries	..	5,548	Trench foot	.. ..	3,294
Synovitis	.. ..	456	Nephritis	.. ..	1,626
			Venereal	.. ..	6,742
		6,004			
Unclassified	.. ..	446			

Total admissions to C.C.S.s for "Sickness" were 106,537.

The figures, compiled from an analysis of all sick admissions to the casualty clearing stations of the Second Army during 1917, may be taken to represent fairly closely the proportional wastage from sickness in this army. It is necessary to allow for errors of diagnosis, and also for fallacies caused by administrative changes. Scabies, for instance, was treated, for months of the period in question, not in clearing stations but under divisional arrangements, and therefore the incidence of that disease would be about one-third greater than shown. On the whole, the figures may be taken as a reliable guide, not only for the Second Army, but for the whole of the Expeditionary Force in France, and—excepting the rise of the curve for influenza in 1918 and that for nephritis in 1915 and 1916—for the whole of the campaign.

Gastro-Intestinal Infections.

The first remarkable fact to note is the comparatively small number of cases of gastro-intestinal infections, and the absence of enteric from any special mention at all, as the cases were so few as to be included under "unclassified." Before this war such infections were undoubtedly the greatest cause of sick wastage. Any officer of the Corps, asked to prophesy the greatest medical danger to a British army fighting for four years in France, would almost certainly have named gastro-intestinal infections. He would have been entirely wrong, for preventive inoculation practically abolished typhoid, and general hygiene largely prevented other intestinal infections. The figures relating to the incidence of enteric might well be emblazoned in gold in every R.A.M.C. mess as a permanent war honour, for the grand total of enteric group infections only amounted to 7423 cases, with a case mortality of 3·58 per cent. (The South African figures were 73,633 cases, with a case mortality of 13·7 per cent.)

Skin Diseases.

The realisation that dirt and vermin were to prove the greatest causes of disease would have had a profound effect on the course of the war. The diseases I have included in groups A and B were responsible for about 50 per cent. of this great wastage. These were almost entirely dirt diseases, and as such preventable. Of the skin affections, scabies and its pyodermic sequelæ were responsible for the great majority of cases, for I.C.T.[2] was frequently simply an alphabetical euphemism for itch. (I should like to see the use of alphabetical diagnoses in the army abolished; it tends to a looseness of diagnosis and to a dulling of perception of pathological causes which are a great hindrance to preventive medicine. Moreover, we all know the Sisyphean labour involved in changing a diagnosis once made.) Scabies *can* be prevented by frequent inspections and immediate isolation for treatment. One army corps instituted weekly inspections of all ranks from the corps commander downwards. It can be cured rapidly, if attacked in the early stages, three or four days being sufficient, whereas in neglected cases with severe pyodermia and ecthymatous conditions supervening months may be needed. At the 25th General Hospital the average duration of the disease before admission was 31 days, and the average time required for a cure a further 31 days. Allowing only 10 days as an average for the 27,000 cases under discussion, we are faced with the huge total of 270,000 fighting days lost by the Second Army alone in one year from this entirely preventable infection.

Before leaving the question of skin infections, the importance of diet and proper cooking should be mentioned. It was often difficult to secure a sufficiency of vegetables, particularly greenstuffs. In a discussion with Colonel S. Lyle Cummins, then Adviser in Pathology, the possibility of this deficiency and of the destruction of vitamins by overcooking in the customary army stew being a cause of pyodermia was raised. An attempt to ascertain the facts was made at a convalescent centre, where half the patients had their meals cooked in the ordinary way and half had their vegetables very lightly cooked. The German offensive unfortunately terminated the experiment before any definite conclusions were reached.

P.U.O., Trench Fever, &c.

Group B might not at first sight appear to belong to the dirt diseases, with the exception of trench fever, which is now universally accepted as a louse-borne infection. Again, however, the truth-concealing alphabet must be arraigned; my own observations, carried out by "sampling" admissions for P.U.O. at the clearing stations, led to the conclusion that at least 80 per cent. were suffering from trench fever, and two independent inquiries made for me by competent clinicians placed the percentage at an even higher figure. Similarly, most of the admissions for myalgia were, in fact, cases of trench fever in an apyrexial stage. It seems clear, therefore, that of the 26,000 cases in this group 20,000 may fairly be regarded as trench fever infections, due directly to

* Abstract of a paper read at the Plymouth Congress of the Royal Institute of Public Health.

[1] Journal of the R.A.M.C., August, 1920.

[2] Inflammation of the cutaneous tissues.

infestation with lice, and therefore preventable. Nor do these two groups include all cases of dirt disease, for a considerable proportion of those included in group C were really the victims of chronic trench fever. Allowing only 1500 as so occasioned, we reach the total of 21,500 cases of trench fever. Allow the very moderate convalescence period of 21 days for each case, and we arrive at another gigantic total of lost effective days—451,500 in all. Taking this figure with the previous total we find that one army, containing probably not more than a fourth of the British forces, lost in one year nearly three-quarters of a million effective days from preventable causes.

Respiratory Infections.

The remaining groups consist of cases which do not so completely fall into the category of preventable diseases. The respiratory infections can to some extent be controlled by attention to billeting requirements, as will be shown later. Moreover, we have by no means exhausted the possibilities of preventive inoculation against pneumonia and bronchitis. The experience of the French, who were faced with a high mortality from pneumonia amongst their black troops, may be recorded; in the 95th Senegalese Battalion the incidence amongst the vaccinated was 36 per 1000, with mortality nil, and amongst the non-vaccinated 130 per 1000, with a mortality of 7 cases. In the 97th Battalion the figures were 73 per 1000 with 2 deaths, and 85 per 1000 with 7 deaths respectively. In another battalion, with a strength of 600, 300 were vaccinated immediately on arriving in France, with a result that only one case, not fatal, of pneumonia occurred, whilst amongst the non-protected 300 men in the same period 16 cases with 4 deaths occurred. These figures suffice to show that inoculation may have a considerable protective value in future wars.

Inherent Physical Defects.—Zymotic Diseases.

In group F are many cases whose wastage was due to inherent physical defects, which should have been detected on recruitment. They formed part of that floating hospital population which exercised a considerable strain on the medical service in France. The lesson to be drawn from this group is that preventive medicine must commence with the recruiting boards, and that man-power must be utilised according to the physical possibilities of the individual.

In group G arises the problem of zymotic diseases, of which we cannot hope to prevent the occurrence in an army, although we can cause a diminution in their incidence. The principle of redistribution in epidemiology is hardly sufficiently understood as yet. Where a number of individuals have been kept together for some time a certain immunity to their common infections is induced, a measure of resistance to the prevailing strains of pneumococci, &c. Break up this collection of men as drafts to many other formations and the immunity engendered may be of small value, the drafts falling victim to infection prevalent among their new companions. Similarly, a "carrier" benign amongst his former companions may spread disease when drafted to a new unit. This question, too large for discussion here, is worthy of careful consideration by the medical service.

Other Forms of Wastage by Disease.

Of group H I have little to say. We must wait for the findings of the Shell Shock Committee[3] to know how far the neuroses of war are preventable. It is hardly necessary to state that venereal disease is preventable when proper disciplinary measures are in force and adequate prophylaxis is available throughout the army area. I think the figures given have justified my contention that a large proportion of the minor sickness leading to wastage, amounting to not less than 50 per cent., was preventable.

It may be of interest to compare the observations made in the American Expeditionary Force, and incorporated in a report by Major Haven Emerson, on the Wastage from Disease in the A.E.F. for the 12 Months ending May, 1918.[4] Of a total of 62,714,000 possible days of military service, 1,481,000, or 2·3 per cent., were lost by illness, the death-rate being 7 per 1000 cases, slightly in excess of the British figure. A list of 42 main causes of illness was given which differed considerably from our experience, acute zymotic infections and respiratory diseases heading the list. During much of the period under review the bulk of the American forces were not in the line. Major Emerson regarded 32·4 per cent. of the wastage, caused by zymotic and venereal disease, as entirely preventable. A further 19 per cent., due to respiratory disease, he looked upon as partly preventable, as troops became more seasoned and hygienic laws were better interpreted. Pneumonia caused grave anxiety in the American army, as the following table shows:—

American Expeditionary Force.

—	No. of cases per 100,000.	No. of deaths per 100,000.	Case mortality. Percentage.
January	259	86	33·1
February	97	33	33·9
March	176	49	27·9
British Expeditionary Force.			
January	17	2·0	14·1
February	6	0·3	5·6
March	10	0·4	4·6

The high pneumonia rate was largely due to overcrowding in billets, where limitation of accommodation resulted in an allowance of only 20 sq. feet and 200 cubic feet per head, as compared with over 40 sq. feet and 400 cubic feet allowed for British troops. Skin diseases caused a loss of 25,563 days, but it was shown that this wastage could be almost entirely eliminated by care, for in one month one division reduced its incidence of scabies from 400 to 4 cases. The report went to prove that nearly half the wastage in the American forces was preventable, a conclusion very similar to the one advanced for the British forces.

Principles of Prevention of Wastage.

How can such preventable wastage be avoided? It is beyond the scope of this paper to do more than indicate a few main principles. First, an efficient medical personnel is necessary; probably the keystone of efficiency is the regimental medical officer. On him rests the responsibility of early detection and immediate isolation, and if he does his work well, the specialists and large staffs behind will be largely idle.

Secondly, provision of ample facilities for personal cleanliness, for changes of clothing, and for disinfestation are essential. It is to be hoped that no British army will take the field again without being provided with means by which every man may, at intervals not greater than once a fortnight, and preferably every ten days, be bathed in hot water, be served out with clean underclothing, and, if necessary, be disinfested, all simultaneously.

Thirdly, provision of convalescent centres in every army area will prove an important adjunct. Fatigue and exhaustion are powerful auxiliaries to disease, and the latter can often be foiled by rest in a suitable centre. Moreover, hospital accommodation is thereby economised, unnecessary evacuation to the base frequently avoided, and much time saved. The war taught us much of very great value as to the possibilities of preventive medicine, and it now remains only to absorb the lesson, and be prepared to put it into practice, endeavouring to foresee what may happen, and frustrate disease before it is established.

I had hoped to complete this paper by a comparison of wastage in industrial life for minor ailments, but unfortunately no statistics appear to be available which give an indication of how the civil population is affected.

[3] The report of the War Office Committee of Enquiry into "Shell Shock," which has since been published, made the following recommendations for prevention of war neuroses:—

(A) *Training.*—1. Every possible means should be taken to promote morale, esprit de corps, and a high standard of discipline. 2. Training should be sufficiently prolonged to ensure that the soldier is not only physically fit and efficient, but also that he has had time to acquire such a standard of morale as will enable him to put the welfare of his unit before his own personal safety. 3. Close observation should be made by officers, both regimental and medical, and by non-commissioned officers of the unit on individuals during the whole of their training, so that abnormalities from which mental or nervous instability may be inferred may not be overlooked. For this purpose there should be the frankest coöperation between regimental and medical officers. 4. The study of character, so far as it is applicable to military life, is recommended for all officers with a view to teaching man-mastership. 5. Special instruction should be given to Royal Army Medical Corps officers in the psycho-neurosis and psychoses as they occur in war, and selected officers should be encouraged to specialise in the study of these disorders.

(B) *On Active Service.*—1. The practice of withdrawal of officers and men showing incipient signs of nervous breakdown or over-fatigue for rest either in the battalion or divisional area should be officially recognised and systematised. 2. So far as the military situation permits, tours of duty in the front line in stationary warfare should be short, especially in bad sectors. Adequate rest and organised recreation should be provided for units when out of the line. 3. Monotony should be avoided by changing units, as circumstances permit, between fronts and sectors. Leave home should be encouraged. 4. The promotion of all measures making for good sanitation and the physical comfort of the men, both in the line and also in rest billets and base depôts, should receive constant attention. 5. Rest of mind and body is essential in all cases showing signs of incipient nervous breakdown, and when possible it should be given under conditions of security and comfort and freedom from all military duties. 6. The fullest use should be made of convalescent depôts for re-training and hardening men discharged from hospital. These units should invariably be pervaded by an atmosphere of complete cure.

[4] War Medicine. Published by the American Red Cross Society in France, vol. ii., No. 2, September, 1918.

OMISSIONS IN UNIVERSITY EXTENSION LECTURE PROGRAMMES.

THE list of courses of University Extension lectures and tutorial classes organised by the University of London for the session 1922–23 has now been issued. Admirable lectures have been arranged throughout London and the suburbs on branches of natural, physical, and mathematical science, on aspects of history, geography, literature and art, on political economy and ethics. But among the long list of titles we fail to find one lecture dealing directly with physiology, hygiene, or allied subjects. It is possible that such subjects are excluded by the regulations governing the courses or by the scheme on which they are planned. In this case we appeal to the Vice-Chancellor, a medical man, who offers a special certificate of continuous study to any student who obtains four sessional certificates satisfying certain conditions, to press for such alteration in the scheme of University Extension lectures and tutorial classes as will permit of the inclusion of physiology and hygiene among them.

NURSING IN THE NAVY.

FOR a hundred years from 1750 the nursing at the Royal Naval Hospitals at Haslar (Gosport, Portsmouth) and at Plymouth was done by untrained women, but men labourers were employed to wash the patients. These women were involved in irregularities, they were very badly paid, and in 1854 they were replaced by men—old pensioners who also were thoroughly untrained. The men continued in office for 30 years, until in 1884 a committee recommended the introduction of a small staff of trained lady nurses into the hospitals, while a sick berth staff should be established to do the nursing of the sick both afloat and ashore, and to replace the old pensioners. The sisters do not appear to have been received by the staff with any enthusiasm, but like the assistant matron in Mr. Ward Muir's "Happy Hospital," they soon earned appreciation. They were on joining instructed to do nothing with their hands, but only to direct the nurses in their work. This is not always possible, but the chief duty of naval sisters is the instruction of the sick berth staff, any one of whom may, on leaving his hospital, find himself the sole dispenser and sole nurse in some ship, and must, therefore, be given a great deal of technical instruction before he goes. At the end of six months the new sisters had won golden opinions which are all stated in the paper by Miss M. L. Hughes, the head sister at Plymouth to-day, in a paper she contributes to the current number of the *Journal of the Royal Naval Medical Service*. It was at once recognised how much the hospital work had gained from their skilled training, character, and example. In 1902 Queen Alexandra gave her name to the Naval Nursing Service, and in 1910 the Naval Nursing Service Reserve was formed, which filled the vacancies in the larger hospitals at once on the outbreak of war, freeing regular sisters for hospital ships and sick berth staff ratings for general service wherever required. In all about 200 reserve sisters were called up, and Miss Hughes pays a tribute to the work of the V.A.D.'s, which was most valuable. Nine sisters lost their lives in the war; the *Rohilla* when she was wrecked, the *Rewa* when she was torpedoed, had each four sisters on board. Besides serving in the home hospitals they go abroad also to Gibraltar, Malta, and Hong-Kong. Miss Hughes is to be congratulated on her interesting paper.

SAFETY FIRST.

AT the eleventh annual Safety Congress held at Detroit, Mich., at the end of August it was stated that there were 76,000 accidental deaths in the United States during 1920, representing a decrease of 400 on the 1919 figure. The large increase in the number of motor-car owners is held to be responsible for the serious increase of motor accidents, which totalled over 11,000. Other major causes of accidental death, with the numbers of victims, were as follows: Falls of all kinds, over 11,400; burns, 8088; railway accidents, 7769; drowning, 6066; gassing, 3618; firearms, 2767; mine accidents, 2660; machinery, 2660; street cars, 2128; other vehicles, 2022; conflagrations, 1277. Fatal accidents to children under 5 years of age numbered 9880, or 13 per cent. of the total. One-third of all motor-car accidents were among children of under 15 years. The 1920 report showed deaths from public accidents to be slightly on the increase, whilst deaths from industrial accidents decreased by 1·3 per 1,000,000 of population, this fact being attributed to the stand made for safer working conditions by the industrial population as a whole. The total industrial fatalities in 1920 numbered 12,500. Of the total accidental deaths in 1920 more than two-thirds were of males. In commenting on this serious preventable wastage of life, the report points out that had the American nation exercised the regard for the life of the citizen that was displayed in England and Wales in 1920, there would have been 37,000 fewer lives lost in the United States. In England from 1911 to 1920 there were 369 accidental fatalities for each million of population; in the United States there were 714 in the same period. Included in the report are details of a comprehensive means for collecting information to bring home to the American people the plain facts of the prevalence of certain kinds of accidents. Standard forms, prepared for use in reporting all public accidents, are to be distributed by the National Safety Council to every public accident official in the United States. In many cities these forms are already being used by police and safety departments.

PUBLIC HEALTH IN INDIA.

WE summarised last week the main diseases prevalent in the Indian Empire, as set out in the annual report of the Public Health Commissioner, under the three headings of European Troops, Native Troops, and General Population. Some of the constructive efforts to deal with disease receive brief mention in the report.

Medical Institutions.

The medical institutions are reported on under four categories. In the State Public, Local Fund, and Private-aided Civil Hospitals and Dispensaries, numbering 3326 in 1920, as compared with 3227 in 1919, a total number of 35,858,660 persons were treated, of whom 636,933 were in-patients; the corresponding figures for 1919 had been 35,078,305 and 636,934; the operations performed totalled 1,100,262, compared with 1,368,614 in the previous year. In Calcutta 482,110 patients were treated at 23 institutions, of whom 41,824 were in-patients. Lieut.-Colonel Leventor, superintendent of the Campbell Hospital, deplores the absence in this great city of any place of refuge for the aged, infirm, crippled, and incurable. In Burma 18 hospitals and dispensaries remained closed; new hospitals or wards are under construction at Pegu, Akyab, and elsewhere. In the second category of institutions 3,032,823 patients were treated at "State special" and railway hospitals, of whom 111,718 were in-patients; and 4,671,428 at "Private, non-aided" institutions, of whom 79,426 were in-patients. The third category comprises the lunatic asylums, of which there are 23; their "total population" was 10,262 and the "daily average strength" 7679.

Sanitary Works.—Research Laboratories.

A number of important sanitary works are in progress in the various provinces. In Bengal the sterilisation of sewage effluents, and the causes of pollution of the Hooghly river have been investigated; in regard to the Hooghly, it was discovered that, in addition to pollution from mills and factories, "there are many hundreds of municipal and other drains daily discharging vast quantities of liquid sewage and surface drainage into the river. . . . At no less than 88 places on the river banks the dumping of refuse into the river is carried on by various municipalities." In Assam the Sanitary Board held only one meeting during the year. In Bihar and Orissa it is stated that "the progress of sanitation has been slow, and is not commensurate with the development of the province in other directions." In the Punjab "a few attempts were made to improve village sanitation, but they did not meet with any great success. . . . The people evince scarcely any desire to change their habits and customs, and unless this barrier is broken no real progress is possible." In Madras Presidency, "as in previous years, conservancy in rural areas has not made any progress worth recording." No report was prepared by the new Public Health Board for 1920. In Bombay Presidency several important water-supply and drainage schemes were sanctioned and dealt with; nine sanitary associations are doing useful work.

The various research laboratories continue to be of the greatest importance and value, both in the field of original investigation, and in the production of vaccines and anti-toxins against cholera, typhoid, influenza, plague, and rabies, as well as in many other directions. At the Kasauli Institute 7506 persons received a full course of anti-rabic treatment (an increase of 997 over the previous year); 0·99 per cent. contracted hydrophobia; the result is not stated, presumably it was fatal. The Europeans treated numbered 646; only one case was fatal, that of a soldier who arrived from Mesopotamia 20 days after being bitten. At Coonoor Institute 3623 patients were fully treated; there were 18 deaths (0·49 per cent.). This institute has been working since 1907; among 22,053 patients fully treated the failure rate was 0·73 per cent. Of 332 persons bitten by rabid animals during the current year, who had not undergone anti-rabic treatment, 118 died of hydrophobia—i.e., 35·5 per cent.

THE death is announced from Amsterdam on Sept. 16th of Prof. J. K. A. Wertheim Salomonson, who occupied the chair of nervous diseases and radiography, and had recently become rector of the University in succession to Prof. da Costa. Prof. Salomonson, who was in his fifty-ninth year, was well known to radiologists in this country where he frequently attended scientific gatherings.